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*EDUCATIONAL RESEARCH, EDUCATIONAL PROGRAMS, *POSTGRADUATE EDUCATION, *IMPROVEMENT PROGRAMS, *CONSULTANTS, *DOCTORAL DEGREES, *CONFERENCES, QUESTIONNAIRES, PROGRAM EVALUATION, INTERVIEWS, GRADUATE SURVEYS, BERKELEY, CALIFORNIA, CENTER FOR THE STUDY OF HIGHER EDUCATION

THE FACTORS WHICH LEAD TO PRODUCTIVITY IN EDUCATIONAL RESEARCH WERE STUDIED. THE PROGRAM WAS DIVIDED INTO FOUR SECTIONS--(1) AN ANALYSIS OF QUESTIONNAIRES FROM 818 PERSONS RECEIVING DOCTORAL DEGREES IN 1954, (2) AN ANALYSIS OF A PREVIOUS STUDY OF 1,750 PERSONS RECEIVING DOCTORAL DEGREES IN 1964, (3) A STUDY OF DISSERTATIONS OF 1,598 PERSONS RECEIVING DOCTORAL DEGREES IN 1964, AND (4) A STUDY OF THE BACKGROUND, TRAINING, AND VARIOUS OTHER ASPECTS OF 31 OUTSTANDING SCHOLARS. INTERVIEWS WERE ALSO CONDUCTED TO STUDY THE GENERAL CLIMATE AND CONDITIONS UNDER WHICH PRODUCTIVE SCHOLARS WORK. BEFORE FINAL RECOMMENDATIONS WERE SUBMITTED, 16 CONSULTANTS WERE INVITED TO OFFER CRITICISMS AND SUGGESTIONS AT A 2-DAY CONFERENCE. TWELVE FINAL RECOMMENDATIONS WERE MADE AND ACCEPTED. THE CONCLUSIONS INDICATED THAT RESEARCH SHOULD BE PROBLEM CENTERED AND CONDUCTED BY INTERDISCIPLINARY TEAMS WHO CAN ATTACK MAJOR PROBLEMS WITH THE INTELLECTUAL AND SCHOLARLY RESOURCES OF AN ENTIRE UNIVERSITY BROUGHT TO BEAR ON THE PROBLEM BEING STUDIED. (RS)

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Training for Educational Research

Cooperative Research Project No. 51074

Guy T. Buswell
T. R. McConnell
Co-investigators
Ann M. Heiss
Dorothy M. Knoell

CENTER FOR THE STUDY
OF HIGHER EDUCATION

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UNIVERSITY OF CALIFORNIA
Berkeley, California
1966

The research reported herein was supported by the Cooperative Research Program of the Office of Education, U. S. Department of Health, Education and Welfare.

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FOREWORD

The Center for the Study of Higher Education was invited by the Division of Research of the United States Office of Education to submit a proposal, under the Developmental Activities Program, for a study leading to recommendations for the improvement of educational research. Such recommendations, it seemed to the Center's staff, should rest on an empirical investigation of the productivity of persons who had earned the doctorate in education, together with an analysis of factors related to the incidence of published research.

It seemed pertinent, also, to interview a group of highly productive researchers concerning their educational backgrounds, the conditions they considered conducive to productivity, and their recommendations for selecting and training future research personnel.

The research staff also made an analysis of the degree of sophistication in design and analysis characteristic of recent doctoral dissertations in education.

All of the lines of investigation indicated that certain variables were related to productivity: the most productive people were, in general, much younger than the nonproductive group; they had not specialized in education as undergraduates but had taken a program of liberal studies; they had been full-time students; and their graduate work had been broadly based on the behavioral sciences instead of being concentrated in courses on education.

Perhaps the most striking finding was that there was little change in the characteristics of persons who had taken the doctorate in education in 1954 and 1964: most graduate students in education spent only part-time on their studies, and took a long period to complete requirements for the degree; too few had a broad undergraduate background in the liberal arts; and too many were too old when they finished.

The fact that little progress had been made in attracting the most promising graduate students led the research team to propose doctoral programs especially devised to recruit and train students for careers in educational research. The staff concluded that potentially productive students must not become submerged among students and in programs whose interest and emphasis were on professional rather than scholarly careers.

The special programs proposed range from those which would be organized outside schools or departments of education, or for that matter, outside any department, to those which would be established in departments of education or disciplines which contribute substantially to research on educational problems. The proposed programs put emphasis on scholarly colleagueship and on participation in research from the inception of doctoral study.

It is to be hoped that the Office of Education, and perhaps interested foundations, will support experimental programs along the lines briefly outlined in this report. It is time for action. Rapidly growing financial support for educational research will be in considerable part unproductive unless selected universities, stimulated by appropriate grants, devise unconventional programs of research training which will produce young scholars who are educationally knowledgeable and methodologically sophisticated.

The Center was fortunate to secure Dr. Guy T. Buswell as co-principal investigator and principal director of the project. He himself has had a distinguished career in educational research, has served as executive officer of the American Educational Research Association, and as a member of the research advisory committee of Phi Delta Kappa, honorary educational fraternity.

The project was begun under the Center for the Study of Higher Education and was completed under the new Research and Development Center, into which the former Center was merged.

T. R. McConnell
Chairman, Center for Research and
Development in Higher Education
University of California
Berkeley, California

ACKNOWLEDGMENTS

Grateful acknowledgment is made to the 31 research scholars who gave generously of their time in interviews and to the 100 research specialists who helped to identify them. Also to the administrative officers in the 102 cooperating universities for supplying names and addresses of their doctoral graduates. Specially appreciated was the cooperation of more than 2500 doctors in education who supplied data by filling out the lengthy questionnaires.

Special thanks is due to those persons in the Center who helped directly on the study: to Dr. Manford Ferris, William Raley, Susan Gieg and Janet Ruyle for help in data processing and computer analysis; to Lynn Sereda who served as research assistant; and to Margie LeBlanc and Suzi Evalenko who helped in many ways throughout the study and in preparing and typing the report.

The services of the persons listed below, who came to Berkeley for a consultants conference on recommendations, was particularly helpful to the staff for the project.

Allan H. Barton, Director, Bureau of Applied Social Research, Columbia University

Roald Campbell, Dean, Graduate School of Education, University of Chicago

Burton R. Clark, Center for the Study of Higher Education, University of California

John Clausen, Director, Institute for Human Development, University of California

John G. Darley, Chairman, Department of Psychology, University of Minnesota

Robert Gagne, Director of Research, American Institute for Research (Now Professor of Education, University of California)

Eric F. Gardner, Chairman, Department of Psychology, Syracuse University

Arthur I. Gates, Supervisor of Research, Institute of Language Arts, Columbia University, Teachers College

Charles Glock, Director, Social Science Survey Research Center, University of California

James L. Jarrett, Associate Dean, School of Education, University of California

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Elbridge Sibley, Director, Social Science Research Council

Julian C. Stanley, Director, Laboratory of Experimental Design, University of Wisconsin

Leona E. Tyler, Dean of the Graduate School, University of Oregon

Ralph W. Tyler, Director, Center for Advanced Study in Behavioral Sciences, Stanford University.

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CHAPTER I

INTRODUCTION AND RECOMMENDATIONS

The problem of this study is to find means for improving educational research by attempting to identify factors that lead to research productivity. Some of these factors reside in the training institutions, their graduate programs, their intellectual climate, and the characteristics of their students and faculty, while other factors reside in the patterns of available professional positions and in the special programs, centers, and institutes within which much educational research is done.

One of the most serious deficiencies of educational research is that it is still composed mainly of fragmentary, small-scale investigations at a time when research on human behavior is no longer produced mainly by individual scholars but is increasingly the product of collaboration. It is clear that the future of educational research will depend in very large degree on methods for securing productive collaboration among methodologists and among scholars in related disciplines. It is likely that formal means for securing collaboration in training for research will need to be devised if educational research is to be substantially improved.

Another serious limitation of current educational research is that it is of relatively unimaginative and uncomplicated design, in spite of the fact that methods of multi-factor design and methods of multi-variate analysis have been developed during the last two decades. As long as this deficiency exists, educational experimentation is unlikely to influence educational practice significantly. Seldom, if ever, do differences in learning correspond to variation in a single variable. Usually differences in performance are the product of the interaction of several factors operating together. Therefore, not much will be learned about controlling the educational process until more complicated methods of design and analysis are employed. This, of course, makes training for educational research far more demanding and difficult. It may well require, as is increasingly true in the physical and biological sciences today, more collaborative effort among doctoral students and mature researchers. It will almost certainly require a longer period of preparation, with time to secure experience in the investigation of more complicated problems. This may make the provision of a large number of post-doctoral fellowships mandatory, as it has already become in the sciences.

The obstacles to the development of educational research are numerous. Until recently financial support was negligible. Although funds for research have been growing, they are still dwarfed by the magnitude of the problems which confront schools and colleges. The climate which nurtures research has often been missing, not only in school systems and state departments of education, but also in schools or departments of education in universities. Too few faculty members in schools of education have devoted a substantial share of their time and energy to research. One reason for this is that teaching loads and service activities have crowded out time for research. It is doubtful, however, that simply freeing the time of present staff members would produce a much greater body of research of high quality. Most of these people have not been selected because of their interest in either basic or applied research, and, furthermore, most of them have not been adequately trained for research. Neither do most of them have the broad background in the behavioral sciences necessary for significant educational research today.

Graduate students find few opportunities for colleagueship with seasoned researchers. "One chief means through which university students gain skills and sensibilities," Lazarsfeld and Sieber pointed out, "is work for faculty researchers on specific projects. This apprenticeship provides the opportunity for personal contact with the work habits of the trained researcher and engagement in the research process itself." These authors went on to say that "In the absence of faculty members who are doing extensive research, and hence, in the absence of student apprenticeships, the only alternative is training in research through formal courses. It is difficult, however, to develop a research orientation among graduate students through course work only, for this leads to the use of 'secondary' rather than 'primary' research sources, or reviews of research rather than original reports."*

It is increasingly apparent that potential researchers need to be identified, selected and encouraged while they are young; that persons engaged in educational research should have a strong background in the liberal arts, rather than extensive courses in education; and that their grounding in the behavioral sciences should be strengthened as they study the philosophy and science of education.

Proposed Study of Training for Educational Research

In the summer of 1964 the Center for the Study of Higher Education, in response to a suggestion from the U. S. Office of Education, submitted a proposal to the Cooperative Research Program for a study of training for educational research. The application for support was approved and work began on the study in January, 1965.

There were four major parts of the investigation. The first part, reported in Chapter 2, was an analysis of returns on a rather lengthy questionnaire from 818 persons who received a doctoral degree in education in the year 1954. Numerous training variables were studied in relation to the research productivity of these doctors during their first ten post-doctoral years. Second, a somewhat parallel study (Chapter 3) was made of 1750 doctors who received their degrees in the year 1964. The principal objective was to find the amount and direction of change during the decade in factors associated with training for research. The third part, reported in Chapter 4, was an analytical study of the dissertations of 1598 doctors who received their degrees in 1964. Since the dissertation is one of the principal features of graduate training programs, the findings should contribute significant information on the content and methodology now characterizing doctoral research. The fourth study (Chapter 5) was an intensive analysis of the background and training, the personal characteristics, and the research productivity of a group of 31 outstanding scholars in education and related fields. Also studied were the general climate and specific conditions under which productive scholars work. The main portion of the data for this part of the study was secured through personal interviews.

In the questionnaires and in the interviews with the select group of outstanding researchers a large number of specific questions were asked which might conceivably be related to training for research. In analyzing the results from the 1954 group of doctors, variables were identified which differentiated significantly between those who had and those who had not published research during the ten year period following their degree. Likewise, in the study of productive researchers factors were identified which seemed to characterize the scholars as a group. From the total study there emerged a number of factors relating to training for research which might be used as criteria for setting up improved research programs. In the interviews with the outstanding research group there was a very substantial agreement as to the importance of these factors. Yet, the evidence supporting them is correlational and judgmental in nature and verification from practice is needed. Therefore, tentative recommendations were prepared for several experimental plans each supported by evidence from the studies. These recommendations range from a major restructuring of the organization and program of training for educational research through a gradation of proposals, some of which can be fitted into the present structure of schools and departments of education.

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*P. F. Lazarsfeld and S. D. Sieber, Organizing Educational Research. Englewood Cliffs: New Jersey, Prentice-Hall, 1964, p. 44 and 48.

Consultants Conference

Before submitting final recommendations the research staff for the study wished to have the criticisms and suggestions of a wider group of knowledgeable persons. Consequently a group of sixteen such persons were invited to attend a two-day consultant conference in Berkeley. A summary of the study and a list of tentative recommendations were sent to the consultants two weeks prior to the conference. During the very productive conference various modifications were made in the tentative recommendations, and one new one (Recommendation 4) was proposed by Dr. Eric Gardner and was added to the list.

Among the conference group were those whose doctoral work was in varied disciplines including philosophy, psychology, sociology, education and perhaps still other fields. Their present positions range from professorships and administrative posts in major universities to positions in administration or research in a wide range of organizations. Nine members of the conference were from fields outside schools or departments of education. This breadth of interest was deliberately designed because of the conviction that any significant improvement in training for educational research must involve the behavioral sciences in general and not be limited to schools and departments of education. A list of the persons who attended the conference follows. Professor T. R. McConnell served as Chairman.

Allan H. Barton, Director, Bureau of Applied Social Research, Columbia University

Roald Campbell, Dean, Graduate School of Education, University of Chicago

Burton R. Clark, Center for the Study of Higher Education, University of California

John Clausen, Director, Institute for Human Development, University of California

John G. Darley, Chairman, Department of Psychology, University of Minnesota

Robert Gagne, Director of Research, American Institute for Research (Now Professor of Education, University of California)

Eric F. Gardner, Chairman, Department of Psychology, Syracuse University

Arthur I. Gates, Supervisor of Research, Institute of Language Arts, Columbia University, Teachers College

Charles Glock, Director, Social Science Survey Research Center, University of California

James L. Jarrett, Associate Dean, School of Education, University of California

E. F. Lindquist, Department of Education, State University of Iowa

Leland L. Medsker, Vice Chairman, Center for the Study of Higher Education, University of California

Elbridge Sibley, Director, Social Science Research Council

Julian C. Stanley, Director, Laboratory of Experimental Design, University of Wisconsin

Leona E. Tyler, Dean of the Graduate School, University of Oregon

Ralph W. Tyler, Director, Center for Advanced Study in Behavioral Sciences, Stanford University.

Two additional statements should precede the recommendations. (a) It is proposed that the federal government provide incentives in the form of financial support for experiments that embody change from present practices. For example, stipends are recommended for young graduate students and for continuous full-time residence. Our hypothesis is that improvement is more likely to result from support of new, desirable practices than from arguments against undesirable ones. (b) The study is focused primarily on Ph.D. graduate programs for research rather than on Ed.D. programs for professional competence. If the Ed.D. program is to include preparation for research, it should be of the type recommended here for the Ph.D., but it is not the function of the present study to debate the Ph.D. vs. Ed.D. issue. Rather, it is recommended that the Office of Education support a study such as the present one which would deal with training for competence in teaching and professional service, for which the Ed.D. program is responsible.

The research staff for this study is indebted to members of the consultants conference for numerous suggestions embodied in the final recommendations which follow.

Recommendations

Recommendation 1. The U. S. Office of Education should provide financial support for from three to five special institutes for training in educational research for an experimental period of five years. The primary purpose of these institutes should be to design, develop, and carry out with a carefully selected group of students a new graduate program for improved training in educational research that might set a pattern for wider use. The institutes should have a maximum degree of freedom from existing professional schools and colleges of education and their concerns for credential requirements and field service. They should study education with the same regard for standards of inquiry that characterize research in other university disciplines. The obligation of the institutes should be to consolidate the available body of verifiable knowledge about education and then to focus all the energies of their staff and students on research dealing with crucial problems of education. The institutes should carry on high grade research so that the students may learn through actual participation as the major feature of their training. To clarify the concept of these institutes the following suggestions are added:

a. The staff for an institute should be a small group of scholars selected for their interest in education, their competence, and their allegiance to research. The majority of the staff should be selected from departments other than education.

b. These institutes should have authority to develop programs and to recommend candidates for Ph.D. degrees directly under the control of the graduate dean.

c. Support should be given for a group of excellently planned research projects in which staff and students work jointly, and selected so as to provide some variety in the research methodologies employed. However, it should be understood that the primary purpose of the proposed institutes is training researchers through participation in research, and that sufficient staff time must be assigned to this training obligation.

d. The student group should be limited to from thirty to fifty persons who are not over 30 years of age, give evidence of superior intellectual ability, have a strong liberal arts undergraduate background, and are sufficiently motivated toward education to commit three consecutive years to full-time residence leading to a Ph.D. degree. To facilitate the recruiting of students at this high level, it is recommended that federal research assistantships be established with stipends large enough to cover the full reasonable expenses of the students for three consecutive years of residence.

e. The federal budget for these institutes should cover salaries of the staff, costs for the research projects, special library source materials and research equipment, and stipends for students described in paragraph d, and other pertinent expenses. The stipends for students should be considered in part as research assistantships on the projects of the institute and part as outright grants for graduate training. Since all of the recommended plans are experimental in character, the budget should provide for continuous study and evaluation of the training aspects of the program, and for a full report at the end of the five year period.

f. To avoid duplication, it is recommended that the institutes should focus on different aspects of research in education.

Recommendation 2. Cooperative inter-disciplinary committee programs should be supported by the U. S. Office of Education. These programs may be included in the present organization of schools and departments of education or may be independent of schools of education and responsible directly to the graduate dean, in which case the Committee should determine (under the graduate school) its own degree requirements and recommend students directly for degrees. The committees should be interdisciplinary in the sense that half or more of the members should be from departments other than education. The function of these committees would be to train and recommend for the Ph.D. degree persons who complete the special programs formulated by the Committee. If organized under a school of education, the Committee should enjoy a large degree of freedom from departmental requirements in regard to the doctor's degrees. Students should be accepted with the same general qualifications as in recommendation 1d above, and they should be supported for a period of three full years of consecutive residence. Committee programs to be supported should represent a broader conceptualization of training for educational research than is presently found in departmental programs in education. Provisior for student participation in research should be provided through support for special projects designed by the Committee. The research envisioned under this plan would be primarily in those areas where cooperation between education and other disciplines would seem to be desirable. The financial commitment of the Office of Education should be for the research projects undertaken, student support, part-time release from teaching, and other necessary relevant costs.

Recommendation 3. Support should be provided for special experimental research-training programs carried on in existing schools or departments of education. This plan puts the burden on the school of education to devise new research-training programs which can be approved for support by the Office of Education. Students for such programs should be selected in accordance with the general qualifications described in recommendation 1d, and the three year condition regarding residence should be required for their support. The principal difference between this plan and the preceding two is that it lends itself to existing departmental organization with the opportunity to devise improved programs of research-training as the faculty sees fit.

Recommendation 4. Special training programs for educational research carried on within specific academic disciplines should receive support. The aim would be to train, e.g., not only economists, or sociologists, or psychologists, but professionals who would be knowledgeable concerning problems in education and dedicated to their solution. A highly competent person, trained in this way, would bring not only the methodology but (what might be more important) the ways of conceptualizing problems that are unique to his discipline. Hopefully, he would interest other professionals in his discipline in educational problems. It would be important (a) to include knowledge of education in the training so that the student could select important educational problems to investigate and (b) to develop a dedication to the solution of educational problems.

Recommendation 5. Support should be provided for special research fellowships for research assistants to a professor. This plan would operate within the present structure of university departments but would be restricted to providing one or more graduate assistants to a particular professor whose participation in educational research warrants such support. The students would be supported as in the previous cases and the same qualifications should be required. It is presumed that a limited number of such fellowships would be available but that professors whose record of research production is strong would receive support for their research programs in this way, and that students qualified as in the other plans and recommended by a professor might apply for support in return for full-residence over a period of three years. Professors who receive student assistants under this plan should be relieved of most of their teaching and committee assignments.

Recommendation 6. The U. S. Office of Education should sponsor two categories of *Doctoral Fellows* to support: (1) those who have high potential as researchers and have recently completed their training, and (2) *outstanding* and *productive* scholars whose research skills and contributions might be *maximized* through their release from teaching and/or other administrative duties.

Recommendation 7. The U. S. Office of Education should undertake a study of the *methods* by which potential research ability may be *identified*, sustained and motivated toward a career in educational research.

Recommendation 8. Support should be provided for the establishment and operation of a *number* of *Institutes for Educational Research* (comparable to the N.S.F. Institutes) which *would offer doctoral recipients* the opportunity to return to the University for a short but intensive re-training on the newer methods and techniques in educational and related research.

Recommendation 9. Feasibility grants should be provided for groups of institutions *which wish to* establish a consortium for research training. (Among other things this might imply the establishment of reciprocal agreements on credits obtained by students and an exchange of graduate research faculty for temporary periods.)

Recommendation 10. The Office of Education should support appropriate agencies to *provide for the* publication of an *Interdisciplinary Abstract of Educational Research* which would provide interested researchers access to investigations of an educational nature in all fields.

Recommendation 11. The Office of Education should establish a *Commission on Training for Educational Research* with responsibility for developing and coordinating experimental programs.

Recommendation 12. In order to implement these proposals we recommend that *universities*:

a. Conduct an intensive recruitment program among undergraduates in the liberal arts to encourage their interest in a research career in education. This might be implemented through an interdisciplinary seminar offered in the social sciences during the junior or senior year.

b. Eliminate the experience requirement for promising candidates who express an interest in research.

c. Free the student from an excessive preoccupation with the *mechanics* of doctoral study by (1) establishing a *minimum* of course requirements (2) providing opportunities for early *immersion* in research (3) encouraging a maximum of *independent study* (4) providing a research environment in which the student is free to experiment with new ideas and methods and to interact with scholars in education and related fields.

CHAPTER II

THE TEN-YEAR POST-DOCTORAL STUDY*

One of the better ways to evaluate training for educational research is to examine the research production that results from a program of training. As far as we are able to determine, no systematic study has been published which attempts to relate output after a period of years to a group of variables associated with a training program. The present chapter reports a ten year follow-up of 818 persons who received doctoral degrees in Education in the year 1954. Its purpose was to find evidence to support recommendations as to what should or should not be done to improve training programs for educational research. Problems were studied relating to (a) variables involved in selecting graduate students, (b) variables affecting the graduate program, and (c) post-doctoral variables that relate to research productivity.

The Sample Selected for Study

Our purpose was to get a nation-wide sample from various types of institutions that award doctoral degrees, selected a sufficient number of years back to allow time for the outcomes of the research training to become evident. We arbitrarily chose the group who received their doctor's degree ten years ago on the grounds that this is the approximate period of time commonly required to reach professional maturity. In university positions, ten years is a reasonable amount of time to reach a full professorship for those who ultimately reach such rank. Recipients of both the Ph.D. and Ed.D. degrees were included on the grounds that, while the Ph.D. is usually defined as a research degree and the Ed.D. as a professional degree, the facts indicate that a sizeable portion of educational research is done by holders of the Ed.D. degree. In addition, there is a very considerable overlap in the training programs in most of the universities that offer both degrees. Even in those institutions which offer only one of the two degrees, their programs include training for both research and professional work.

In January 1965 a letter was sent to the deans of Schools of Education or heads of Departments of Education of the 103 institutions that awarded doctoral degrees in education in the years 1954 and 1964. Lists of persons receiving either a Ph.D. in education or an Ed.D. degree were received from 102 of the 103 institutions. As indicated in Table 1, there were 1495 persons who received doctoral degrees in education in the year 1954. We arbitrarily excluded from the scope of the study all persons with foreign addresses, most of whom were natives of other countries who had returned home after completing their graduate work. There was a loss of 27 cases due to erroneous listing of the date of the degree or due to the major work being done in a department other than education. There remained 1370 valid cases for the year 1954. Obtaining current addresses for some of these names, particularly from the two largest institutions whose address files were far from complete, proved to be a serious obstacle. Our staff searched every known directory but there were 241 names for whom no current addresses could be found. Questionnaires were then mailed to the remaining 1129 doctors who received their degrees in the year 1954. Returns were received from 818 of these persons. This was a 60 per cent return of the valid cases and a 72 per cent return from those whose addresses were known and to whom questionnaires were mailed.

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*The study reported in this chapter was done by Guy T. Buswell. Professor Emeritus (Educational Psychology), University of California, Berkeley.

TABLE 1

THE SAMPLE OF DOCTORS IN THE 1954 GROUP

1.	Total number cases on lists from institutions	1495
2.	Number with addresses outside U. S.	73
3.	Number deceased	25
4.	Number in wrong year or not in Education	27
5.	Number valid cases remaining (Row 1 minus Rows 2+3+4)	1370
6.	Number for whom no correct address was available	241
7.	Number to whom questionnaires were mailed (Row 5 minus Row 6)	1129
8.	Number of questionnaires received (filled out)	818
9.	Per cent returns of valid cases (Row 5)	59.7%
10.	Per cent returns of those who received questionnaire (Row 7)	72.4%

The Questionnaire and Its Treatment

Since the only feasible way to secure the information needed for this portion of our study was through a questionnaire, an eleven-page form was prepared (see Appendix) in the usual manner. The questionnaires were sent with an accompanying letter by first-class mail and return postage was pre-paid. They were mailed the last week in April and the cut-off date for replies was the end of July.

As the questionnaire returns were received, the customary processing procedures were followed. Questions needing coding were so marked by members of the research staff and all coding was re-checked for accuracy by one of the co-investigators. A code book was prepared for the IBM card punch operator. After the punched cards were checked for accuracy, the data were transferred to computer tape and initial tabulations, giving frequencies, per cents, means, and standard deviations, were run through the computer. Descriptive tables for each of the variable was then prepared from the computer sheets.

The Classification of Questionnaire Returns

The principal purpose of this portion of the study was to discover whether persons who had published research during the ten year period differed significantly from persons who had not published research, in respect to the characteristics covered by the questionnaire. It was therefore necessary to arrive at some basis for differentiating the research group from the no-research group. This was done on the basis of the returns on question 64 which asked for a listing year by year of the research that had been published by the person returning the questionnaire.

Classifying the group into different categories was simple for those persons who stated on their questionnaire blank that they had done no research during this ten year period and for persons who listed published studied that were of unquestioned research character. However, there were doubtful cases where persons simply left the page blank with no indication as to whether they had done any research, or whether they simply thought the request for listing was more than they could take time to do. Rather than risk misclassification, such persons were put in a category by themselves. The most difficult problem of classifying resulted from returns by persons who apparently interpreted the question as a request for a total bibliography of all publications during the ten year period, mixing research reports with miscellaneous articles of a non-research character. Often these publications were brief one or two page notes or comments on some educational topic, but in other cases they consisted of general articles or essays on various educational subjects. It became necessary then to set up some criteria as to which publications would be classified as research and which would not.

The following criteria were reviewed by the research staff and were accepted as guidelines for classifying the references listed in the questionnaire returns:

(1) The research must be published. Typewritten papers and mimeographed reports were not included.
(2) References in local publications dealing with matters of purely local concern were excluded.
(3) In general, book references were excluded, although if a portion of the book contained a primary report of a research study it was listed.
(4) Reveiws of research or of professional books were excluded.
(5) Studies of a philosophical or logical nature were accepted if they were published in a reputable journal in that area.

Most of the research publications included were empirical studies containing substantive evidence. Primarily, we wished to distinguish those publications which were serious systematic studies of problems based on the collection of evidence, from publications which talked about a problem but where nothing more than the opinion of the author supported what was said. In terms of the design of the study, it is better to classify any doubtful cases in group 5 of the following categories rather than in group 3, since the main comparisons are between group 2 (research) and group 3 (no research).

Using the criteria described above, the 818 persons in our sample were classified into five categories as follows:

(1) Persons who had published only one research study in the ten year period,
(2) those who had published two or more research studies,
(3) those who, by their own statement written on the questionnaire blank, had published no research during the ten year period,
(4) persons who had left the page blank with no indication as to whether they had nothing to list or whether they simply did not take the trouble to list it, (the assumption is that in most of these cases the page was left blank because there was no research publication to list) and
(5) persons who listed references in their report which the members of the staff who made the classification could not accept as being research according to the criteria which were followed.

Table 2 gives the number of persons in each category listed separately by Ph.D., Ed.D., and the total group. As indicated in Table 2, of the 295 Ph.D.'s in the total sample, 46 or 15.6 per cent had published only one study, 20.3 per cent had published

TABLE 2

CLASSIFICATION OF Ph.D. AND Ed.D. RECIPIENTS BY NUMBER OF RESEARCH PUBLICATIONS IN TEN YEARS, 1954 - 1964 (Q. 24)*

Category	Ph.D.		Ed.D.		Both Groups	
	n	%	n	%	n	%
One research publication	46	15.6	61	11.7	107	13.1
Two or more research publications	60	20.3	41	7.8	101	12.3
No research, by own statement	75	25.4	177	33.8	252	30.8
No research listed - assume none	64	21.7	94	18.0	158	19.3
Listed items not research	37	12.5	123	23.5	160	19.6
No information	13	4.4	27	5.2	40	4.9
Total	295	99.9	523	100.0	818	100.0

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*Items on the questionnaire will be identified by the letter Q followed by the numbers of the question on which the table is based.

two or more studies, 25.4 per cent had published no research whatever, 21.7 per cent probably had published none, 12.5 per cent had listed items which could not be classified as research, and in the remaining 4.4 per cent there was insufficient information for classifying. The corresponding numbers and per cents for Ed.D.'s and for the total group are given in the remaining columns of Table 2.

Since the basic design of this portion of the study hinges on the categories in Table 2, it may be worthwhile to state more explicity our hypotheses regarding these five groups. The basic comparison throughout this chapter will be between the population samples of category 2 and category 3, those who had published two or more research studies on the one hand, and those who had published no research at all on the other. The large number of variables covered by items 1 to 63 of the questionnaire will be examined in terms of whether or not there is a significant difference between these two populations. Those items for which a significant difference does appear will then be subjected to a multivariate discriminant analysis that will serve as a guide for recommendations designed to improve the programs of training for educational research. Among the five groups categorized in Table 2, it is hypothesized that the greatest difference will be between groups two and three. Group four should resemble group three more than group two, and group one should resemble group two more than group three. Group five should probably lie somewhere between groups one and four, but nearer to group four than to group one.

The study takes into account the fact that the stated objectives of the Ph.D. degree are different from the stated objectives of the Ed.D. degree. There is no inference that one set of objectives is superior to the other; rather they are simply different sets of objectives, each justified by valid reasoning. In theory, holders of the Ph.D. degree have a basic obligation to extend the limits of knowledge in the field in which the degree is held. Since the major portion of persons holding this degree are also members of academic faculties and do some teaching, it is assumed that the teaching should be competent and that it should reflect the intellectural curiosity of research-minded persons. It would be expected that many of the students of these Ph.D.'s would themselves be candidates for this degree and that their interests would tend toward expanding knowledge through research rather than toward a high degree of skill in educational practice. On the other hand, candidates for the Ed.D. degree are expected to be the experts in professional practice and in training students for careers in various aspects of administration, supervision, and teaching. There is certainly no reason why an Ed.D. with an inquiring mind should not do research and, as indicated by the data in Table 2, many of them have done so. Ph.D.'s who do not do research should be viewed with concern, whereas Ed.D.'s who do not do research should be evaluated in terms of professional competence rather than research production.

One may insert a question at this point as to whether the Ed.D.'s in group two might have been better advised to take the Ph.D. program and whether the Ph.D.'s in group three might not have been better advised to take the Ed.D. program. One frequently encounters the statement that some Ph.D.'s have taken that degree only because of the aura of status attached to the word "research", whereas some persons take the Ed.D. degree only because of the omission of foreign language requirements as a hurdle for that degree. At any rate this would be a subject for a useful investigation. The matter is complicated by the fact that some institutions give only the Ph.D. degree whereas others give only the Ed.D..

In transfering data from the computer sheets, tables in the form of that shown in Table 3, (p.12) were prepared for each of the variables covered by the questionnaire. The sheer bulk of these tables prevents their insertion in the main body of this report or even in the Appendix but they are available in the files of the Center for the Study of Higher Education of the University of California (Berkeley) and are open to inspection by anyone who is interested in them. Table 3 is given simply as a type indicating how the data were classified.

Student Selection Variables

A number of items in the questionnaire relate to characteristics of students at the time of their admission for graduate study. From examination of the descriptive tables of data for each question, it appeared that ten of these selection variables merited more careful study. Those that appeared to be significant were placed in a pool of variables for a multivariate analysis to be reported in a later portion of this chapter. In the present section, each of the ten variables will be given a descriptive analysis in terms of the second and third research categories described earlier. In dealing with the data, the reader should recall the characteristics of these two groups, which are as follow: group two - published two or more studies; group three - published no research (by their own statement).

1. Age at receiving doctor's degree. Over the years there have been repeated discussions of age as a factor in graduate study. Generally the conclusion has been that a younger age would be desirable, but little change in practice has resulted. Our first concern here was with the research production of those who were awarded a doctoral degree at an early age as compared with those who finished the work for their degree much later. Data from the present study relating to this question are shown in Table 3.

The top tier of data in Table 3, for the Ph.D.'s only, shows that 25 per cent of group two (research) received their doctor's degree at age 32 or under as compared to 13.3 per cent of group three (no-research) in the same age group. Twenty per cent of those in group two received their degree at age 40 or over, as compared to 44 per cent in the no-research group. For the Ed.D.'s cases, 41.5 per cent of those who published two or more research studies were at age 32 or younger as compared to only 13.7 per cent in the no-research group for this age bracket. In terms of the research produced in the ten years following the doctoral degree, it is clear that more of those who got the degree at the age 32 or under are productive than are those who got their degree at age 40 or older.

The characteristics of groups 1, 4, and 5 also may be observed. For the Ph.D.'s, group 4 (probably no research) resembles group 3 (no research), as do the data for the Ed.D.'s in group 5. The Ph.D.'s in group 5 show a U-shaped distribution resembling group 3 at ages 40 and over and group 2 at ages 32 and under. For the total group of Ph.D.'s and Ed.D.'s, it is distrubing to note that more than twice as many received their doctor's degree at age 40 or later, than at age 32 or earlier. A comparison of mean ages for group 2 (research) and group 3 (no-research) showed the following: for the Ph.D.'s only, the mean ages of groups 2 and 3 respectively were 35.6 and 38.8; for the Ed.D.'s; 36.6 and 38.7; and for the total of both degrees, 36.0 and 38.7.

Another way of viewing the data on age is afforded in Table 4, which gives the number of research studies published by Ph.D.'s and Ed.D.'s combined, and including both group 1 (one research study) and group 2. As shown in column six, those who received their degree at age 32 or younger, had an average of 2.9 publication per person during the ten year period, whereas those age 40 or over published an average of 1.8 studies per person. Not only was there a larger per cent of persons in the younger age bracket in the research as compared to the no-research group (30% vs 15%), but those in the younger group also published 61 per cent more studies per person than did those in the older age bracket.

One further set of data throws still more light on the matter of age. Table 5 gives a complete age distribution for the total sample at the time of receiving the bachelor's, master's, and doctor's degrees. For the total group of 818 cases, the average age at the bachelor's degree was 23.6 years, at the master's, 29.8 years, and at the doctor's, 38.8 years. The Ed.D.'s are older than the Ph.D.'s at each level.

TABLE 3

AGE AT DOCTOR'S DEGREE IN RELATION TO RESEARCH CLASSIFICATION (Q. 3)

Age	Research Category*											
Ph.D.'s Only	1		2		3		4		5		No inf.	
	n	%	n	%	n	%	n	%	n	%	n	%
32 & under	13	28.3	15	25.0	10	13.3	7	11.1	13	35.1	3	25.0
33-39	17	37.0	33	55.0	32	42.7	25	39.7	7	18.9	3	25.0
40 & over	16	34.8	12	20.0	33	44.0	31	49.2	17	45.9	6	50.0
Total	46	100.1	60	100.0	75	100.0	63	100.0	37	99.9	12	100.0
No age	--	----	--	----	--	----	1	----	--	----	1	----

Ed.D.'s Only	1		2		3		4		5		No inf.	
	n	%	n	%	n	%	n	%	n	%	n	%
32 & under	17	27.9	17	41.5	24	13.7	14	15.2	14	11.7	5	18.5
33-39	19	31.1	13	31.7	78	44.6	36	39.1	37	30.8	9	33.3
40 & over	25	41.0	11	26.8	73	41.7	42	45.7	69	57.5	13	48.1
Total	61	100.0	41	100.0	175	100.0	92	100.0	120	100.0	27	99.9
No age	--	----	--	----	2	----	2	----	3	----	--	----

Total Ph.D.'s & Ed.D.'s	All Ph.D.'s		All Ed.D.'s		Total Cases	
	n	%	n	%	n	%
32 & under	61	20.8	91	17.6	152	18.8
33-39	117	39.9	192	37.2	309	38.2
40 & over	115	39.2	233	45.2	348	43.0
Total	293	99.9	516	100.0	809	100.0
No age	2	----	7	----	9	----

*Research Category:

1. one study published
2. two or more studies published
3. no research (by own statement)
4. no research listed (probably none)
5. studies listed not research

TABLE 4

NUMBER OF RESEARCH STUDIES PUBLISHED BY AGE AT RECEIVING DOCTOR'S DEGREE. (ALL CASES, Ph.D. PLUS Ed.D.) (Q. 3 and 64)

Age	Groups 1 and 2 (research)					Group 3 (no research)		
	No. of Persons		Research Studies Published		Average Studies per Person	No. of Persons		Research Studies Published
32 & under	62	30%	177	37%	2.9	38	15%	none
33-39	82	39%	194	40%	2.4	111	44%	none
40 & over	64	31%	115	24%	1.8	101	40%	none
Total	208	100%	486	101%	2.3	250	99%	none

Even a casual inspection of Table 5 indicates that those who hold doctoral degrees in education are a retarded group. In the schools of the United States it is normal to enter the first grade at age 6, graduate from high school at age 18, and from college at age 22. The master's program is usually one year additional, and the doctor's program is usually two years beyond the master's. If, therefore, a person pursued his education continuously to the doctor's degree, the age for getting the doctor's would be 25. Only 3 of the 818 doctors of the year 1954 had earned their degree by this age. If one were to apply liberal norms he might give an extra two years for the bachelor's, making a normal age of 24, another three years for the master's, making a normal age of 27, and three more years for the doctor's, making a normal age of 30. The broad horizontal lines on Table 5 give these points of demarcation. On this liberal basis, 27 per cent of the total group of 1954 doctors were retarded at the time they received their bachelor's degree, 60 per cent were retarded at the time they received their master's degree, but 90 per cent were retarded by the time they received their doctor's degree. To be sure these "norms" are arbitrary and may seem harsh to persons in the educational profession, but in academic departments they would not seem unreasonable. Data published in 1963 by the National Research Council*give median ages at the doctorate for the year 1961 as follows: physical sciences group, 28.7 years; biological sciences, 30.5 years; social science group, 32.0 years. Yet only 10 per cent of the total group of 1954 doctors in education received their degree by age 30.

Two facts emerge from this portion of our study. The first of these is the startling scarcity of doctors in education who receive the degree by age 30. Only 12 per cent of the 295 Ph.D.'s and 9 per cent of the 523 Ed.D.'s, received their degree by this age. There are compelling reasons why this number should be at least 50 per cent. The years available for productive research are cut-down drastically when the degree is awarded in half the cases at age 38 and older as is the case with this group. Even more important for research is the freedom of inquiry which characterizes the younger student as contrasted with commitments to things as they are which is so often found with students beginning their graduate work after a long period of experience in the schools. We would agree that there may be substantial reasons why the age at receiving the Ed.D. degree should be somewhat higher than that for the Ph.D., but in neither case can anything approaching the present degree of retardation be defended.

The second major fact, indicated in Table 4, is the small amount of published research from our sample group. In the ten year period following the award of their doctoral degrees, the 818 persons who received their degrees in 1954 published a total of 486 research studies as classified in this investigation. This is an average of 0.6 studies per person in ten years. Accepting the fact that Ed.D.'s do not have a primary commitment to do research, there were only 15 per cent of them that published any research, and of these the average number of publication per ten year period was 2.3 per person. However, persons receiving the Ph.D. degree do have a commitment for doing research, since this is one of the primary objectives of that degree. The 295 Ph.D.'s in this study published a total of 270 studies or an average of 0.9 studies per person for the ten year period. Only 106 of the 295 cases, or 36 per cent, published any research at all. Of those who did publish, the average number of studies per person for the ten year period was 2.5. Although some unpublished research was produced, much of it is local in character, dealing with problems of a particular school system or institution in which the researcher is employed, and is often inconsequential, resting on such small samples as to have no statistical significance. Even where it possesses real value, the unpublished study reaches a comparatively small audience. A field of study can grow only in terms of shared research, published so as to be available for the total audience concerned with the development of education.

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*National Research Council, Publication No. 1142, p.44. 1963.

TABLE 5

AGE AT RECEIVING BACHELOR'S, MASTER'S, AND DOCTOR'S DEGREE IN EDUCATION, 1954. (Q. 3)

	Bachelor's			Master's			Doctor's		
Age	PhD	EdD	Total	PhD	EdD	Total	PhD	EdD	Total
18	1	2	3						
19	2	18	20						
20	34	43	77		1	1			
21	61	89	150	4	7	11			
22	51	108	159	9	13	22			
23	42	61	103	18	18	36		1	1
24	33	43	76	19	26	45	1	1	2
25	15	37	52	22	38	60	0	0	0
26	12	29	41	28	43	71	3	4	7
27	11	20	31	24	50	74	4	6	10
28	7	17	24	25	39	64	7	6	13
29	9	9	18	12	42	54	11	9	20
30	1	9	10	20	31	51	10	18	28
31	1	7	8	18	35	53	10	18	28
32	6	6	12	18	30	48	14	27	41
33	1	4	5	16	27	43	14	21	35
34	1	4	5	10	11	21	19	27	46
35	1	3	4	9	11	20	17	30	47
36	1	2	3	12	15	27	12	25	37
37	0	1	1	7	18	25	20	32	52
38	1	0	1	2	8	10	15	24	39
39	0	2	2	2	9	11	19	34	53
40	1	1	2	1	11	12	17	35	52
41	1	2	3	3	5	8	15	25	40
42				2	3	5	15	24	39
43				2	5	7	18	12	30
44				0	1	1	8	29	37
45				1	3	4	5	20	25
46				0	1	1	10	10	20
47				0	1	1	6	9	15
48				2	1	3	2	16	18
49				1	0	1	5	11	16
50				0	1	1	4	10	14
51				0	0	0	2	7	9
52				0	0	0	1	4	5
53				0	0	0	2	9	11
54				1	0	1	2	5	7
55					1	1	1	1	2
56					0	0	1	3	4
57					1	1	1	0	1
58							1	1	2
59							1	0	1
60								2	2
no inf.	2	6	8	7	17	24	2	7	9
Total	295	523	818	295	523	818	295	523	818
mean	23.4	23.7	23.6	29.4	30.1	29.8	38.2	39.2	38.8
S.D.	3.4	3.7	3.6	5.4	5.6	5.5	6.5	6.7	6.7
n minus no inf.	293	517	810	288	506	794	293	516	809

2. **Time of decision to study for doctor's degree. Item 22 of the questionnaire**

***Calculation of mean is based on total n minus no information n.**

asked "when did you first decide to study for a doctor's degree." The number making this decision before entering college was too small to be of any consequence. For the Ph.D. group, 20 per cent of those doing research and 20 per cent of those not doing research decided to study for the doctor's degrees while in college. For the Ed.D. group, the corresponding percents were 12.1 and 12.4. For the Ph.D. group doing research, 71.6 per cent did not decide to go on for doctoral work until after they finished college as compared with 78.6 per cent of those in the no-research group. For the Ed.D. doctors, 80.4 per cent of the research group and 85.8 per cent of the no-research group, postponed their decision until after they finished college. Although on the whole the research group decided to study for the doctor's degree somewhat earlier than the no-research group, the differences are too small to be of any significance. The really significant fact is that only one out of five students planned to do doctoral work until after finishing college. Although education is usually not an undergraduate major, and probably should not be, nevertheless this results in an absence of stimulation to study education as a graduate major. For the academic subjects, early interest in a field of study is nurtured throughout the undergraduate period. While there are professional courses offered at the undergraduate level in teacher training programs, there is seldom a course in education designed primarily to study education in the same way that chemistry, or mathematics, or history is studied. In fact, the professional undergraduate courses aimed at skills in teaching and administration may actually serve to repel research-minded students rather than attract them to education as a field for graduate study.

The results of a late decision to study for a doctoral degree is also indicated in the number of years elapsing between bachelor's and doctor's degrees. For the combined group of Ph.D.'s and Ed.D.'s, 31.7 per cent of the research group took their doctor's degrees within an interval of 8 years from the time of the bachelor's as compared with 20.2 per cent for the no-research group. However, for the research group, 35.6 per cent took their doctor's degrees 16 or more years after the bachelor's as compared with 46.8 per cent of the no-research group. Again the impressive fact is not so much that the research group allowed less time to elapse between bachelor's and doctor's degrees than did the no-research group, but rather that both groups allowed so many years to elapse between the two degrees.

Between first enrollment for graduate work and the final award of the doctor's degree, 56.6 per cent of the Ph.D.'s held full-time jobs for five or more years. For the Ed.D.'s, the corresponding per cent was 64.8. It is clear, therefore, that the retardation of the greater portion of the doctors was not due so much to a late start in beginning graduate work as to factors that caused them to temporize so long before finishing it. This may reflect one of the outcomes of early marriage where family obligations necessitate full-time jobs or it may be due to lack of sufficient motivation to carry through what was begun. To the extent that this delay in completing graduate work is due to economic necessity, the data point to the need for some program of assistance through loans or stipends.

3. Amount of teaching or other educational experiences prior to doctor's degree. The number of years of teaching experience prior to the doctor's degree is negatively related to research production in the ten years following the degree. As shown in Table 6, for the Ph.D.'s, 18.3 per cent of the group doing research had no previous teaching experience as compared with 2.6 per cent of the no-research group. In the research group, 23.3 per cent had 11 or more years of teaching experience as compared with 40.0 per cent in the the no-research group. Although the Ed.D. group had more experience prior to the doctor's degree than the Ph.D. group, as would be expected, 36.5 per cent (4.8 and 31.7) of the Ed.D's. who had published research had five years or less of teaching experience as compared with 19.1 per cent (2.2 and 16.9) for the no-research group. At the other end of the scale, of those with 11 or more years of teaching experience, the research group percentage was 36.5 compared with 50.8 per cent for the no-research group.

The factors of age at the time of taking the doctor's degree, lateness of decision to go on for graduate work, and amount of professional experience prior to the doctor's degree, are all interrelated, but their relationship to research production is similar. Those with little or no teaching experience are also the younger graduate students.

It is often argued that educational researchers should be familiar with schools through teaching in order to be aware of problems needing research. However, teaching does not necessarily result in awareness of educational problems and in many cases it seems rather to result in acceptance of things as they are as the way they should be. There are other ways to become knowledgeable about schools than through teaching, and the young researcher who concentrates upon some particular phase of education may become more aware of problems that need study through his observations in the school, than is the teacher who is necessarily involved in keeping the class activities moving.

TABLE 6

TEACHING AND/OR OTHER SCHOOL EXPERIENCE BEFORE DOCTOR'S DEGREE (Q.8)

Number of Years	Ph.D. Research n	Ph.D. Research %	Ph.D. No Research n	Ph.D. No Research %	Ed.D. Research n	Ed.D. Research %	Ed.D. No Research n	Ed.D. No Research %
none	11	18.3	2	2.6	2	4.8	4	2.2
1-5	21	35.0	21	28.0	13	31.7	30	16.9
6-10	14	23.3	22	29.3	11	26.8	53	29.9
11 or more	14	23.3	30	40.0	15	36.5	90	50.8
no inf.	--	----	--	----	--	----	--	----
Total	60	99.9	75	99.9	41	99.8	177	99.8

Number of Years	All Ph.D.'s n	All Ph.D.'s %	All Ed.D.'s n	All Ed.D.'s %	Total Cases n	Total Cases %
none	25	8.4	12	2.2	37	4.5
1-5	86	29.1	102	19.5	188	22.9
6-10	81	27.4	147	28.1	228	27.8
11 or more	102	34.5	260	49.7	362	44.2
no inf.	1	.3	2	.2	3	.3
Total	295	99.7	523	99.7	818	99.7

4. Type of institutions from which bachelor's degree was received. The institutions granting bachelors degrees were classified in seven groups as indicated in the key below the Table 7. The third category in the classification is a group of 49 selected liberal art colleges. This group was obtained by combining several previously published lists of purported outstanding colleges, and then eliminating from the combined list those institutions which granted doctoral degrees. We had expected to find that the product of the highly selective liberal art college would be the best breeding group for research-minded students. However, as will be observed in Table 7, this proved not to be the case. The largest number of students in the research group came from the undergraduate division of those universities which grant doctoral degrees. Forty-six and six tenths per cent of the Ph.D.'s and 48.7 per cent of the Ed.D.'s in the research group came from these major doctoral-degree institutions. A total of 55 doctors received their degrees from the group of selected liberal art colleges. From this 55, only three appear in the group of those publishing two or more research studies. Seven doctors who received their degrees from this group of colleges were in group one, having published only one study each. Only 5 per cent of the doctors from the selected liberal art colleges contributed two or more published research studies as compared with 16 per cent from the undergraduate divisions of major universities. Other published reports have indicated that a high percentage of the graduates of these select liberal art colleges go on to doctoral degrees in other fields. It may be that education attracts less the research-minded graduate of these colleges, or it may be that the selection that does come to graduate departments of education is more interested in general scholarship than in research.

Almost half of the doctors in the research group in our study hold bachelors from universities that have graduate programs leading to the doctor's degree. Teachers colleges supply only one out of twelve Ph.D.'s and one out of eight Ed.D.'s in the research groups, and are less important sources of potential researchers than are the major universities or the small colleges and universities that do not grant doctoral degree. In terms of the type of institution from which bachelors degree were obtained, it should be noted that the greatest difference between the research and the no-research group is in the universities that have doctoral programs leading to the doctor's degree. The percents of the research and no-research groups in this type of institution are 46.6 compared to 34.6 for the Ph.D.'s and 48.7 compared to 32.2 for Ed.D.'s.

TABLE 7

FROM WHAT INSTITUTION DID YOU RECEIVE YOUR BACHELOR'S DEGREE? (Q. 21a)

Institution*	Ph.D.				Ed.D.			
	Research		No Research		Research		No Research	
	n	%	n	%	n	%	n	%
1	28	46.6	26	34.6	20	48.7	57	32.2
2	8	13.3	12	16.0	6	14.6	36	20.3
3	2	3.3	5	6.6	1	2.4	7	3.9
4	15	25.0	24	32.0	9	21.9	47	26.5
5	5	8.3	7	9.3	5	12.1	24	13.5
6	1	1.6	1	1.3	--	----	4	2.2
7	--	----	--	----	--	----	--	----
other	1	1.6	--	----	--	----	2	1.1
Total	60	99.7	75	99.8	41	99.7	177	99.7

Institution	All Ph.D.'s		All Ed.D.'s		Total Cases	
	n	%	n	%	n	%
1	114	38.6	178	34.0	292	35.6
2	44	14.9	72	13.7	116	14.1
3	19	6.4	36	6.8	55	6.7
4	86	29.1	150	28.6	236	28.8
5	24	8.1	75	14.3	99	12.1
6	5	1.6	7	1.3	12	1.4
7	1	.3	--	----	1	.1
other	2	.6	5	.8	7	.8
Total	295	99.6	523	99.5	818	99.6

*Institution:

1. All institutions granting doctor's degree in Education.
2. All Universities not in class 1 above.
3. Select list of Liberal Arts Colleges.
4. All colleges not on #3 Select List.
5. Teacher's Colleges.
6. Professional Schools.
7. Others, unclassified.

5. Major subject in institution where bachelor's degree was received. In comparing the research and the no-research groups in respect to the major subjects for their bachelor's degree, there were few clear cut differences. The same percentage of doctors in the research group took education as their major subject as was the case in the no-research group. Likewise, in the social sciences, physical and biological sciences, and humanities, there were few consistent differences in the undergraduate major for the research and the no-research groups. The only conspicuous difference, and it was quite clear cut, was in respect to the subject of psychology. For those taking their Ph.D., the per cent of majors in psychology in the research

group was 15.0 as compared with 1.3 for the no-research group. For the Ed.D.'s the corresponding percentages were 7.3 and 1.1. Evidently the undergraduate major in psychology provides something that is conducive to doing research following a doctor's degree in education.

6. Number of courses in education as an undergraduate. In the questionnaire inquiry, the number of courses taken as an undergraduate was classified in five groups, namely, none, one to three, four to six, seven to nine and, ten or more. As shown in Table 8, a comparison of those who published research with those who have not published research, in respect to the number of undergraduate courses in education reveals a negative relationship between the number of courses carried and the publication of research studies. For the Ph.D.'s, 38.3 per cent of the research group carried three or fewer courses in education as an undergraduate as compared with 25.2 per cent for the no-research group. There was no difference for those who carried from four to six courses, the per cents being 25.0 and 25.3. But for those who carried seven or more courses in education as an undergraduate, 33.2 per cent of the research group was in this category as compared with 46.6 in the no-research group. The Ed.D. group shows a similar relationship, that is, the smaller number of courses is associated with the larger number doing research. In the research group 23.3 per cent of the Ph.D.'s and 26.8 per cent of the Ed.D.'s had taken no undergraduate courses in education as compared with 18.6 per cent and 12.9 per cent in the no-research group. Data are not available in this study to indicate which kinds of undergraduate courses in education are related to doing research and which are not. Most of the undergraduate courses offered in education are designed to meet credential requirements for teachers' certificates. Many of them emphasize methodology and professional techniques. Of the entire 818 cases in our sample, 23.5 per cent of the doctors had taken ten or more undergraduate courses in education. Of the 193 doctors who took this large number of undergraduate courses, only 43 have published as many as one research study. If, in place of the ten or more undergraduate courses in education carried by these 193 doctors, there could have been substituted an equal number of well selected courses in liberal arts, it is quite possible that such a broader undergraduate base might have

TABLE 8

NUMBER OF COURSES IN EDUCATION AS AN UNDERGRADUATE (Q.6)

Number of Courses	Ph.D.				Ed.D.			
	Research		No Research		Research		No Research	
	n	%	n	%	n	%	n	%
none	14	23.3	14	18.6	11	26.8	23	12.9
1-3	9	15.0	5	6.6	3	7.3	12	6.7
4-6	15	25.0	19	25.3	10	24.3	45	25.4
7-9	10	16.6	15	20.0	8	19.5	47	26.5
10+	10	16.6	20	26.6	7	17.0	48	27.1
other	2	3.3	2	2.6	2	4.8	2	1.1
Total	60	99.8	75	99.7	41	99.7	177	99.7

Number of Courses	All Ph.D.'s		All Ed.D.'s		Total Cases	
	n	%	n	%	n	%
none	48	16.2	75	14.3	123	15.0
1-3	36	12.2	43	8.2	79	9.6
4-6	90	30.5	140	26.7	230	28.1
7-9	52	17.6	118	22.5	170	20.7
10+	60	20.3	133	25.4	193	23.5
other	9	3.0	14	2.5	23	2.7
Total	295	99.8	523	99.6	818	99.6

stimulated more intellectual interest in the field of education as graduate students. There may be a place for a few newly designed courses which would treat education as a field for study rather than as a collection of professional skills and techniques.

7. Marital status at bachelor's, master's, and doctor's. For the entire group of 818 doctors the per cent married at the time of the bachelor's degree was 20.6, at the time of the master's degrees 61.3, and at the time of doctor's degree 81.1. Comparing the research and the no-research groups for the Ph.D. cases, the percents were as follow: at the time of the bachelor's degree 13.3 per cent in the research group compared with 24.0 per cent no-research group were married; at the master's level, 60.0 per cent compared with 68.0 per cent were married; and at the doctor's level, 78.3 per cent of the research group as compared with 84.0 per cent of the no-research group were married. In respect to the Ed.D. cases the situation was reversed. At each level the per cent married was larger in the research group than in the no-research group. The differences between the research and the no-research groups are not statistically significant, but if they were little could be done to change marriage age even if it were desirable to do so. However, the facts are of interest in the planning of doctoral programs in two respects: (1) the increased economic cost of maintaining dependents which must be set off against the amount of support earned by the spouse; (2) the degree to which family responsibilities may detract from the time and energy needed for graduate study. A study of past data indicates that age of marriage fluctuates with the spirit of the times and that the present high rate of early marriage is not necessarily permanent. However, as will be shown later, the per cent married has continued to increase in the decade 1954-1964.

8. Father or mother engaged in educational work. No statistically significant difference was found between the research and no-research groups in respect to whether their fathers or their mothers had been previously engaged in educational work. For the entire sample of cases, only 12.1 per cent of the fathers and 19.8 per cent of the mothers had been engaged in such work.

9. Education of father and mother. Again there is no statistically significant difference between the research and the no-research groups in respect to the amount of education of the father or mother. However, it is interesting to note that for all 818 doctors the highest education of 40.8 per cent of the fathers and 38.1 per cent of the mothers was graduation from an elementary school. Only 13.0 per cent of the fathers and 8.7 per cent of the mothers had graduated from college. The per cent of parents holding doctor's degrees was 3.9 per cent for the fathers and 0.3 per cent for the mothers. The academic status of the present group of 1954 doctors marks a very substantial step in academic mobility.

10. Original objective for graduate study. On entering graduate school the original objective of the research group was somewhat higher than that of the no-research group. For the Ph.D.'s, 60.0 per cent of the group at the beginning of graduate study expected to work only for the master's degree as compared with 65.3 per cent of the no-research group. For the Ed.D.'s the corresponding percents were 58.5 and 71.7. Approximately 20 per cent of each group expected from the beginning to continue work for the doctor's degree. For the Ph.D.'s, 16.6 per cent of the research group originally planned to take the doctoral degree in another department but later changed to education, as compared with 12.0 per cent for the no-research group. For the Ed.D.'s the corresponding per cents for this category were 14.6 and 3.9. The research group therefore contained a larger number of persons who had transferred to education after an original start in another department. It is significant to note that for the entire group of 818 doctors 66.9 per cent originally planned to work only for a master's degree.

Summary of selective factors. In the preceeding parts of this section, 10 variables have been examined which are related to the recruiting and selecting of graduate students for doctoral programs. In six of the cases the variable is sufficiently related to research production to warrant inclusion in a later multivariate analysis. In the remaining four cases the relationship to research production is low, but the data reported furnish useful knowledge for those who formulate policies in institutions for graduate training.

In respect to age at the time of receiving the doctor's degree, it is clear that those who receive the degree by age 32 or younger are more productive than those who receive the degree at age 40 or above. Not only did a higher per cent of the younger group participate in research following their doctoral degree but the younger group also produced more research as indicated in the average number research studies published per person. The data indicate that, for the entire group of doctors, there is a small amount of retardation at the time of the bachelor's degree, considerably more at the master's, and a very large amount at the doctor's. The average age of the 818 doctors, 38.8 years, is impossible to justify in comparison with the age at which the doctor's degree is earned in many of the academic departments.

Indirectly related to age are two other factors which are significant in respect to research production. One of these is the late age in deciding to do graduate work. Eighty per cent of the doctors did not make this decision until after they had finished college. There is apparently no effective counseling program among college students which would inform them about the opportunities for research in education. In addition to this late decision in regard to doing graduate work, there was the additional evidence of a low objective at the time that graduate work was begun, 80 per cent of them intending only to work for a master's degree. A master's degree is a teaching degree and this means that many of these doctors had no idea when they began their work of following a program leading to research production. A master's program designed for teaching is quite different from a master's program designed to provide training for research in education.

The amount of teaching experience was shown to be negatively related to research production. Not only did it appear that a great many productive doctors had no teaching experience prior to the time they received their doctor's degree, but the data also showed that for those who had ten years or more of teaching experience, the research production was less than for the other group. The factor of teaching experience is somewhat involved since a larger amount of it means both an increase in the age of obtaining the doctor's degree and a possible effect on originality of thinking about problems of education. For the Ph.D. group, in particular, it would be hard indeed to justify the large amount of teaching experience which most of the doctors had before finishing their graduate work.

The fifth item which seems to be directly related to research production is the number of undergraduate courses in education. The situation here is similar to that of teaching experience. It is apparently quite possible to do research without any undergraduate courses in education and for those who have had an excessive number of such courses, research production is negatively affected. In this case also the problem is complex. An excessive number of undergraduate courses in education prevents an increased liberal education for candidates for the doctor's degree by substracting from the possible time for liberal arts courses. In addition, the nature of some of the undergraduate courses is questionable. Some of these courses may be defended in terms of skills required for teaching but might be a complete loss as far as stimulating interest in education as a subject for study and research. It may be that the organization of a few liberal undergraduate courses in education as a subject for study might well be justified as compared with simply advising the students in this area to take more courses in the social sciences. If the latter process is followed, then it seems desirable to examine the content of courses in social sciences in relation to their value for education. Certainly the place of education in the general economy would warrant considerably more treatment of some of the educational problems involved than is usually found in the current college textbooks on economics, and the same could be said for sociology. Among the behavioral sciences, psychology stands out conspicuously in its contribution to research production. Sociology and economics show nothing like the effect on research production which was exhibited by the subject of psychology.

The remaining selective factors show less direct relationship to research production. It should be noted that approximately half of those who produce research come from institutions where there are graduate programs for the doctoral degree and where there is an institutional climate of research. The small number of cases recruited from the selected group of liberal art colleges poses a question for further study, namely, to what extent is education attracting the best students from these colleges, or is it getting any of the best.

Marital status showed no direct relationship to research production, but it did reveal a decided change in the composition of the graduate student body as compared with the situation twenty years ago and, as noted, the direction of this change is in the last ten years showed a continual increase in the proportion of married students.

In respect to education of parents and the number of parents who are engaged in teaching or other educational work, the data show no decided influence of these factors on research production, but they throw light on the general background of graduate students in the field of education. The large percentage of parents with only elementary school education and the small per cent of college graduates is worth pondering.

Graduate Program Variables

Many of the variables in the questionnaire relate in one way or another to the graduate training program. Some of these variables were found not to be statistically significant in respect to differences between the research and the no-research group. While these will have no value for the present section, which is concerned with finding variables that differentiate the two groups, tables for some of the variables that are omitted here will be included in the later section of this report where the 1954 and 1964 groups of doctors are compared. Ten of the program variables will be examined in detail in this section of the report.

1. Research experience when a graduate student. Item 35 of the questionnaire asked, "Did you work in a research bureau (center, institute) during your period of graduate study?" As shown in Table 9, of the Ph.D.'s in the research group, 38.3

TABLE 9

WORK IN A RESEARCH BUREAU OR CENTER WHILE A GRADUATE STUDENT (Q. 35-1)

Response	Ph.D.				Ed.D.			
	Research		No Research		Research		No Research	
	n	%	n	%	n	%	n	%
yes	23	38.3	9	12.0	11	26.8	16	9.0
no	35	58.3	64	85.3	29	70.7	161	90.9
no inf.	2	3.3	2	2.6	1	2.4	--	----
Total	60	99.9	75	99.9	41	99.9	177	99.9

Response	All Ph.D.'s		All Ed.D.'s		Total Cases	
	n	%	n	%	n	%
yes	60	20.3	67	12.8	127	15.5
no	229	77.6	451	86.2	680	83.1
no inf.	6	1.9	5	.9	11	1.3
Total	295	99.8	523	99.9	818	99.9

per cent answered yes as compared with 12.0 per cent in the no-research group. For the Ed.D.'s the corresponding percentages were 26.8 and 9.0. This question applied to any kind of work in a research bureau. Question 9-2 narrowed the inquiry to those who were research assistants in the bureaus, excluding those who did only clerical or routine work. For the Ph.D.'s 25.0 per cent of the research group were employed at some time as research assistants in a research bureau, compared with 10.6 per cent of the no-research group. The corresponding data for the Ed.D.'s were 17.0 per cent for the research group and 5.6 per cent for the no-research group. These are statistically significant differences and they point clearly to the value of providing research experience while a graduate student. In terms of productive research in the ten years following the doctor's degree, these differences are more than two to one for the Ph.D. group and more than three to one for the Ed.D. group favoring those who were research assistants in a research bureau. In response to question 9-1 which asked whether the student was a "research assistant to a professor" as contrasted with being research assistant in a bureau, the differences are of the same order although slightly less in amount. For the Ph.D.'s in the research group 33.3 per cent of the students had served some time as a research assistant to a professor as compared with only 17.3 per cent in the no-research group. For the Ed.D., the corresponding percentages were 21.9 and 11.2.

A number of sub items under question 35 provided information on the value of work in a research bureau. Less than 4 per cent of the research group found the experience in the bureau to be routine with no value other than financial. Twenty per cent of the research group as compared with 5.3 per cent of the no-research group found the work in the bureau the most valuable part of their training. Corresponding percents for the Ed.D.'s were 12.1 and 6.2. Only 6.6 per cent of the research group reported that they had little opportunity to learn about the problems being researched. Although working in a research bureau may not automatically be a valuable training experience for graduate students, nevertheless the data indicate clearly that here is a research potential of much importance. But it is equally clear that if research bureaus are to assume obligations of training for research, part of the activities of the staff must be focused directly on this objective.

2. Publishing research reports prior to the doctor's degree. Item 11 of the questionnaire asked, "Did you publish (individually or joint authorship) any research reports prior to receiving the doctor's degree?" Of the Ph.D.'s 48.3 per cent of the research group answered yes as compared with 20.0 per cent of the no-research group. For the Ed.D.'s, the corresponding percents were 39.0 and 14.1. Here again is a statistically significant difference between these two groups, in each case the per cent in the research group being more than twice the per cent in the no-research group. For the graduate student, preparing a research report in all of the stages through publication is not only a strongly motivating experience but is also excellent practice for research production in the post-doctoral period. Yet only one out of four of the total group of 818 doctors had this experience as a part of their training program.

3. Full-time residence as a graduate student. In the earlier days of graduate education it was the custom of all institutions conferring doctoral degrees to require a minimum of one full academic year of continuous residence, and in general this requirement was rigidly enforced. The present situation is revealed in the responses to two items in the questionnaire. Question 12 asked, "During your graduate work, how many semesters (or quarters) were you a full-time student?" (In compiling the data quarters were translated into semester equivalents). For the Ph.D.'s, 9.9 per cent of the research group reported less than one year of full-time residence as compared to 15.9 per cent in the no-research group. For the Ed.D.'s, the corresponding percents were zero and 20.2 per cent. At the other extreme, for the Ph.D.'s, 13.3 per cent of the research group and 10.6 per cent of the no-research group reported more than four years of full time residence; for the Ed.D.'s, the corresponding percents were 4.8 and 5.0. However, full time residence in its original sense of actual presence on the campus has been diluted by administrative rulings to the point that the term is becoming meaningless. For example, one major university on the west coast defines full-time residence as the equivalent of four semester hours of course credit, and such practice is by no means uncommon. Under such rulings it is possible to satisfy the residence requirements for the doctor's degree in education without being actually present on the campus full time at all. In fact, 11.3 per cent of the total group of 818 doctors in this study reported "none" in response to this question. They had held full-time jobs during the entire period of their graduate work and had

satisfied the requirements by late afternoon, evening and Saturday classes. They had missed all of the intangible products of living in the climate of a major university where graduate work is pervaded by the spirit of research.

In order to get a better pricture of residence in the truer sense of the term, respondents were asked in question 14, "What was the longest period of continuous full-time residence as a graduate student in the institution from which you received the doctor's degree? This means while not having a full-time job." For serious graduate study the important factor is not so much the total amount of full-time residence as the total amount of continuous full-time residence which provides a long uninterrupted period for graduate study. As indicated in Table 10, for the Ph.D.'s, 58.3 per cent of the research group as compared with 48.0 per cent of the no-research group reported two years or more of continuous full-time residence. The corresponding percents for the Ed.D.'s were 46.3 for the research group and 25.4 for the no-research group. At the other extreme, for the Ph.D.'s, 18.3 per cent of the research group had only 6 months or less of continuous residence as compared to 26.6 for the no-research group. The corresponding percents for the Ed.D.'s were 19.4 and 30.4.

TABLE 10

FULL-TIME CONTINUOUS RESIDENCE (Q. 14)

Months of Residence	Ph.D.				Ed.D.			
	Research		No Research		Research		No Research	
	n	%	n	%	n	%	n	%
Less than 6 mo.	8	13.3	10	13.3	3	7.3	38	21.4
6 mo.	3	5.0	10	13.3	5	12.1	16	9.0
9 mo.	3	5.0	4	5.3	2	4.8	22	12.4
12 mo.	6	10.0	10	13.3	5	12.1	32	18.0
15 mo.	3	5.0	5	6.6	4	9.7	22	12.4
18 mo. or more	35	58.3	36	48.0	19	46.3	45	25.4
no inf.	2	3.3	--	----	3	7.3	2	1.1
Total	60	99.9	75	99.8	41	99.6	177	99.7

Months of Residence	All Ph.D.'s		All Ed.D.'s		Total Cases	
	n	%	n	%	n	%
Less than 6 mo.	43	14.5	90	17.2	133	16.2
6 mo.	23	7.7	63	12.0	86	10.5
9 mo.	26	8.8	51	9.7	77	9.4
12 mo.	37	12.5	84	16.0	121	14.7
15 mo.	22	7.4	67	12.8	89	10.8
18 mo. or more	133	45.0	149	28.4	282	34.4
no inf.	11	3.7	19	3.5	30	3.6
Total	295	99.6	523	99.6	818	99.6

The extent to which summer school study still characterizes graduate work in education is indicated by the fact that 38.3 per cent of the research group and 56.0 per cent of the no-research group were in residence for four or more summer sessions. For the Ed.D.'s, the corresponding percents were 58.5 and 58.1. The principal reason for interrupted residence for graduate students in Education is the fact that so many of them hold full-time jobs during the year and do their graduate studies only in late afternoon, evening and Saturday classes, or in summer sessions spread over a period of years. These are job centered students who do their graduate study in spare time and under the conditions of pressure and fatigue which make impossible the degree of absorption in a research oriented program as experienced by full-time residence students who live for three years in the research climate of a major university. This is one of the areas in greatest need of attention in respect to the improvement of training for educational research. This interrupted residence is the prime reason for the time lapse between first enrollment as a graduate student and receiving the doctor's degree. For the Ph.D.'s in this study, 16.6 per cent of the research group as compared with 32.0 per cent of the no-research group had a time lapse of eleven or more years between first enrollment and receiving the doctor's degree. The corresponding percents for the Ed.D.'s are 26.8 and 37.2. For all 818 doctors in this study, 69.5 per cent had a time lapse between first enrolling for graduate work and receiving the doctor's degree of 6 years or more, and 33.0 per cent of 11 years or more.

4. Teaching assistant while a graduate student. The experience of being a teaching assistant does not differentiate significantly the Ph.D. research and no-research groups nor the Ed.D. research and no-research groups when taken separately. But with the combined groups there is a statistically significant difference, the percent of teaching assistants in the research groups being 44.6 as compared with 32.9 for the no-research groups. It may be that the difference is due to the type of student selected for teaching assistants rather than in the type of experience provided by the work that they do.

5. Courses in statistical methods, research methods, and in college mathematics. Although it is commonly accepted that courses in statistical methods are essential for educational researchers, the data show no statistically significant difference between the research and no-research groups in respect to number of such courses taken. For the Ph.D.'s, as shown in Table 11-A, 3.3 per cent of the research group as compared with 10.6 per cent of the no-research group had no courses in statistics.

TABLE 11-A

NUMBER OF COURSES IN STATISTICAL METHODS (Q. 26)

Number of Courses	Ph.D.				Ed.D.			
	Research		No Research		Research		No Research	
	n	%	n	%	n	%	n	%
none	2	3.3	8	10.6	1	2.4	11	6.2
1	12	20.0	18	24.0	8	19.5	41	23.1
2	19	31.6	23	30.6	17	41.4	81	45.7
3	8	13.3	15	20.0	9	21.9	32	18.0
4 or more	18	30.0	11	14.6	6	14.6	11	6.2
no inf.	1	1.6	--	----	--	----	1	.5
Total	60	99.8	75	99.8	41	99.8	177	99.7

Number of Courses	All Ph.D.'s		All Ed.D.'s		Total Cases	
	n	%	n	%	n	%
none	28	9.4	38	7.2	66	8.0
1	65	22.0	118	22.5	183	22.3
2	106	35.9	207	39.5	313	38.2
3	48	16.2	111	21.2	159	19.4
4 or more	47	15.9	46	8.7	93	11.3
no inf.	1	.3	3	.5	4	.4
Total	295	99.7	523	99.6	818	99.6

The corresponding percents for the Ed.D.'s were 2.4 and 6.2. This is a small minority of the total group. Forty-three and three tenths per cent of the Ph.D. research group had 3 or more courses in statistics as compared with 34.6 per cent of the no-research group. The corresponding percents for the Ed.D.'s were 36.5 for the research group as compared with 24.2 for the no-research group. Slightly more of the no-research group had one or two courses in statistics than did the research group.

The data suggest that something in addition to taking courses may be needed to produce functional competence in statistical types of research. That this is indeed the case is indicated in Table 11-B, which gives the data for Item 30, Column B of the questionnaire. Table 11-B shows the per cent of "yes" responses for statistical topics "not learned as a student but which you have learned since." The striking differences between the research and the no-research groups indicate clearly that the productive research group in substantial numbers had learned their statistical techniques through independent study in connection with their research activities. This supports the finding reported earlier regarding the value of participating in research as a research assistant. It also suggests that statistics might be taught better if some genuine experiences with its use were incorporated into the formal courses.

TABLE 11-B

TOPICS LEARNED SINCE YOU WERE A STUDENT -"YES" ANSWERS ONLY

Code on Q. 30-b*	Ph.D.				Ed.D.			
	Research		No Research		Research		No Research	
	n	%	n	%	n	%	n	%
1	2	3.3	1	1.3	--	----	5	2.8
2	3	5.0	1	1.3	--	----	9	5.0
3	6	10.0	7	9.3	1	2.4	8	4.5
4	11	18.3	5	6.6	7	17.0	11	6.2
5	17	28.3	5	6.6	10	24.3	12	6.7
6	9	15.0	4	5.3	11	26.8	7	3.9
7	24	40.0	2	2.6	11	26.8	7	3.9
8	17	28.3	7	9.3	11	26.8	16	9.0
9	20	33.3	15	20.0	12	29.2	37	20.9

*Key:

1. Elementary descriptive statistics
2. Correlation
3. Sampling theory; f and t tests
4. Factor analysis
5. Analysis of variance and co-variance
6. Multivariate analysis
7. Nonparametric techniques
8. Experimental design
9. Computer programming techniques

The number of courses taken in research methodology was reported in item 27 of the questionnaire. Because of general interest in such courses, the results are shown in Table 12, although there is no statistically significant difference between the research and the no-research groups. The only consistent relationship in the table is in the none category where for both Ph.D.'s and Ed.D.'s the number in the research groups who had no courses in methodology was smaller by a considerable amount than in the no-research group. However, the value of research methodology courses is in no sense as positive and clear as is the value of experience as research assistant to a professor, or as research assistant in a research bureau.

In view of the increasing complexity of the statistical design of many research studies, it was thought that there might be some relationship between research production and the number of courses in college mathematics that had been taken. Here again, as in the case of courses on methodology, the data are inconsistent, inconclusive, and not statistically significant. For example, among the Ph.D.'s, slightly more in the research group had no courses in mathematics than in the no-research group, although for the Ed.D.'s the data were reversed. It is interesting and disturbing to note that for all 818 cases, 25 per cent had no courses in college mathematics. However, 28.8 per cent of all cases had as many as four or more such courses.

TABLE 12

NUMBER OF COURSES IN RESEARCH METHODOLOGY (Q. 27)

Number of Courses	Ph.D.				Ed.D.			
	Research		No Research		Research		No Research	
	n	%	n	%	n	%	n	%
none	7	11.6	17	22.6	5	12.1	32	18.0
1	31	51.6	33	44.0	16	39.0	75	42.3
2	16	26.6	21	28.0	18	43.9	43	24.2
3	4	6.6	3	4.0	2	4.8	12	6.7
4 or more	1	1.6	--	----	--	----	12	6.7
no inf.	1	1.6	1	1.3	--	----	3	1.6
Total	60	99.6	75	99.9	41	99.8	177	99.5

Number of Courses	All Ph.D.'s		All Ed.D.'s		Total Cases	
	n	%	n	%	n	%
none	50	16.9	86	16.4	136	16.6
1	143	48.4	238	45.5	381	46.5
2	82	27.7	139	26.5	221	27.0
3	11	3.7	32	6.1	43	5.2
4 or more	6	2.0	21	4.0	27	3.3
no inf.	3	1.0	7	1.1	10	1.1
Total	295	99.7	523	99.6	818	99.7

In item 34-1 of the questionnaire, respondents were asked to rate research technique courses as to their value for doing research. Approximately an equal number of the research and the no-research groups rated them as having some or great value, whereas those who did no research were more convinced that research method courses had no value than were those who did research. Only 51 per cent of those in the research group stated that the methods of research that they used were learned in education courses.

6. Courses taken outside departments of education. Contrary to what is often assumed, doctors in education take a considerable amount of their graduate work in departments outside of education. For all 818 doctors, 42.5 per cent took ten or more courses in departments other than education as a part of their graduate training. Only 8.3 per cent of the total group of doctors had taken no courses outside the department of education. For the Ph.D.'s, 53.3 per cent in the research group compared with 49.3 per cent in the no-research group carried ten or more courses outside the department of education. With the Ed.D.'s, the corresponding per cents were 48.7 and 31.6. Several items asked for an evaluation of courses taken outside the department of education and for student reactions to these courses. No significant differences are apparent between the research and the no-research groups, but the reaction of the total sample may be of some interest. Seventy-nine per cent of all the doctors said that they felt at home in these courses rather than as an outsider. Seventy-one per cent reported no less interest on the part of the professor in them than in the students in his own department. Eighty-one per cent of the students reported no difficulty in making friends with graduate students in other departments. The number of friendships formed were reported to be equally due to personal as contrasted with academic interest.

In the research group, 15.0 per cent of the Ph.D.'s and 12.1 per cent of the Ed.D.'s found courses outside the department of education of no special value as training for research. However, 30.0 per cent of the Ph.D.'s and 14.6 per cent of the Ed.D.'s reported that the topics for their dissertations were directly influenced by courses outside the department of education.

7. Preparing a Master's thesis. It has frequently been argued that the preparation of a master's thesis provides valuable training for doctoral research. This may have been the case at an earlier date when master's theses were usually thought of as minor pieces of research done with the same kind of care as would later be required for a doctor's dissertation. The evidence from the present study indicates no statistically significant difference between the research and the no-research group in respect to whether they did or did not write a master's thesis. For the total Ph.D.'s and Ed.D.'s combined the percentages of the research and no-research groups who wrote a master's thesis were 56.4 and 55.2.

Since many institutions now accept a review of the literature as satisfying the requirement for a master's thesis, it was thought that there might be a differences between the research and no-research groups if only those master's theses which required the collection of a body of original data were considered. However, here again there was no statistically significant difference between the two groups. It may be worth noting that 43.6 per cent of the combined Ph.D.'s and Ed.D.'s in the research group did not prepare a master's thesis but continued directly toward their doctoral dissertations. This is similar to the per cent for the group as a whole, where 44.9 per cent did not write a master's thesis.

8. Debt at the time of receiving a doctoral degree. For the Ph.D.'s there was a statistically significant difference between the research and the no-research groups in the per cent of persons who were in debt at the time of receiving their doctor's degree, the per cents in debt being 8.3 and 21.3 respectively. However, 80.5 per cent of the total group of 818 doctors were not in debt at the time of receiving their doctoral degree. The per cent in debt at the time of receiving the degree in the research group was less than half of the per cent in the no-research group. Item 41a asked the question, "If you were in debt at the time of receiving your doctor's degree, approximately what per cent was your debt of your total income for the following twelve months." For the research group only one out of twelve students was in debt at all at the time of receiving his doctor's degree, and in only one case among these was the debt more than 50 per cent of the income for the following year. Debt for graduate work was not a major problem for the research group of those who received their doctoral degrees in 1954, but one may well suspect that this was the case only because most graduate students in education hold full-time jobs during a large part of their graduate study. This may be a high price for staying out of debt.

9. Sub-field of education. Item 4 of the questionnaire asked respondents to check the sub-field of education in which their doctor's degree was received. For the entire group of Ph.D.'s the four most prominent sub-fields were as follows: educational psychology, 19.6 per cent; educational administration, 15.5 per cent; counseling, 13.2 per cent; and curriculum , 6.7 per cent. For the Ed.D.'s the top four groups were: administration, 39.9 per cent; counseling, 8.7 per cent; curriculum, 6.6 per cent; and educational psychology, 5.1 per cent.

When classified in terms of published research, these four sub-fields are also at the top of the list. When analyzed according to per cents of the research and of the no-research groups, the outcomes are somewhat different and are as follows: for educational psychology, in the research group there were 41.6 per cent as compared with 16.0 per cent in the no-research group for the Ph.D.'s, while for the Ed.D.'s, the corresponding percents were 9.7 and 3.3. For educational administration, of the Ph.D.'s the per cent in the research group was 13.3 as compared with 21.3 in the no-research group, whereas for the Ed.D.'s the corresponding percents were 34.1 and 50.2.

Thus in both groups the percent of administrators doing research was approximately two-thirds of the percent in the no-research group. For the sub-field of counseling, the percents of students in the research and the no-research groups are substantially the same for both Ph.D.'s and Ed.D.'s. In the sub-field of curriculum more Ed.D.'s than Ph.D.'s are in the research group. Research in educational methods, history of education, philosophy of education, and educational sociology suffers on account of the small number of graduate students who take degrees in these sub-fields. Only 5.4 per cent of the total group of 818 doctors checked any one of these four fields as the major sub-field, and only 17 persons in these four fields combined reported any published research.

10. Public versus private institutions granting doctoral degrees in education. Fifty-five per cent of the 1954 doctors in education received their degrees from publicly supported institutions as compared with 44.2 per cent from privately supported institutions. There is a statistically significant difference in the amount of published research done by the graduates of these two classes of institutions. For the Ph.D.'s only, 75.0 per cent of the research group was from public institutions as compared with 53.3 per cent in the no-research group, while for the Ed.D. group only, the corresponding percents were 63.4 and 49.7.

The differences are even more striking when stated in terms of the total Ph.D.'s and total Ed.D.'s. Of the 295 persons who took their Ph.D.'s in 1954, 175 were from public institutions, and of these 26 per cent were in the research group; 118 of the 295 were from private institutions and of these, only 13 per cent were in the research group. When the Ed.D.'s are compared in the same way, 10 per cent of those from public institutions were in the research group as compared with only 6 per cent of those from private institutions. This is a differences of two to one in favor of the public institutions. While there are marked differences in the cases of a few outstanding private institutions, for the country as a whole the amount of educational research done in public institutions as compared with private institutions is quite impressive.

Summary of program variables. Of the 10 program variables examined in this portion of the study, five were found to be sufficiently significant to warrant further examination and analysis.

(1) The first of these involved actual participation while a graduate student in doing research either as an assistant to a professor or as an assistant in a research center or bureau.

(2) There was a significant difference between those who published research prior to receiving the doctor's degree and those who did not. This is related to the previous finding and indicates the value of carrying a student's experience as a research assistant to the final stage of publishing or cooperating in the publication of a final study.

(3) The amount of full-time residence while a graduate student raises one of the critical questions in regard to graduate work. The data indicated clearly that for many persons who work for their doctor's degree in education the process was a distinctly part-time operation, being done while they held full-time jobs. Due to the fact that most of these full-time jobs are in school systems, either in teaching or in administration, the result is that the candidate for the doctoral degree is deprived of living in a research climate during his period of graduate study. Furthermore, this interrupted residence stretches out the period of graduate study and raises the age at which the doctoral degree is received, thereby cutting down the productive period that follows the award of the doctor's degree. Graduate students in medicine are usually accepted only when they can pursue a full-time continuous period of residence until they get their M.D. degree. It is only a very small percent of doctors in education who have earned their degree in such a period of full-time continuous residence.

(4) The data revealed a significant relationship between the amount of debt incurred at the time of receiving the doctor's degree in respect to the research and no-research groups. Significantly fewer doctors in the research group were in debt at the time of receiving their degree than was the case for those in the no-research

group.

(5) Finally, there was a marked statistically significant difference between the public and private institutions in respect to the percent of doctors in the research group and the no-research group. The percent of doctors from public institutions who have published research is significantly higher than is the percent of those from private institutions, although in total attendance nation-wide the difference in enrollment between the two classes of institutions is only about 10 per cent.

Five of the variables examined in this section did not differentiate significantly between the research and the no-research groups. (1) Teaching assistantships may provide valuable experience in terms of future college teaching, but they contribute no significant amount to research production following the award of the degree. (2) There was no significant difference between the research and the no-research group in respect to the number of courses they had had in research methods, statistics, or college mathematics. This does not mean that such courses have no value, but that simply taking such courses does not necessarily show positive results in terms of future research. There was a significant difference between the two groups in respect to the amount of statistics learned since taking courses in this subject. (3) The report on courses taken outside the department of education showed a very substantial amount of such work being done, but again it was not significantly related to research production in the post-doctoral years. (4) Contrary to common beliefs, the master's thesis contributed no significant amount toward post-doctoral research. (5) Finally, the sub-fields of education in which the doctors specialized is of interest chiefly in relation to the fields where much research or little research is being done. The differences between the research and no-research groups are most notable in respect to administration and educational psychology. Curriculum and counseling show lesser amounts of research, but distinctly more than is the case for the remaining sub-fields of education.

Post-doctoral Variables

The two preceeding sections of this chapter dealt with the effects on later research production of (a) the selection of graduate students who will be candidates for the doctoral degree and, (b) variables in the graduate training program. The present section will deal with post-doctoral variables that have an effect on research production. It is not enough simply to select excellent students and to train them effectively; attention also needs to be given to their nurture after the award of the doctoral degree, particularly in the earlier years. Five post-doctoral variables in our study show a significant relationship to future research production of doctors.

1. Professional position. Item 63 in the questionnaire asked for a listing of all positions held during the ten years following the award of the doctor's degree, omitting summer teaching positions. The data from this question permitted several types of analysis and these will be presented in sub-section a to g. However before doing this, two items of explanation need to be made.

First, the term position should be defined as used in this study. We define position as a job in any one institution or system in a given locality. Changes in rank were not considered as changes in position, nor were changes of duties assigned in a given institution or system. For example, a position as a member of the faculty of X University was considered as one position even though the incumbent might progress in rank from instructor to full professor, or might be assigned various kinds of administrative duties. Likewise, a position in a public or private school system was considered as a single position even though the person might progress from teacher to supervisor and to administrator or counselor. Moving from one position to another position involved a move to a different school system or to a different institution. In case of universities having several branches located in different cities, a change of position from one campus to another campus in a different city was counted as a new position. Non-academic positions were treated in the same way. A position with a given firm was counted as a single position no matter what type of promotions within the firm were made. These definitions of position apply when a person moves from one position to another.

Second, in coding the questionnaire for types of positions the categories listed below Table 13 were used. With this clarification of the term position we shall return now to an analysis of the data, comparing the research and no-research groups.

TABLE 13

PRESENT POSITION* OF 818 DOCTORS OF THE YEAR 1954 (Q. 2)

Position	Ph.D.				Ed.D.			
	Research		No Research		Research		No Research	
	n	%	n	%	n	%	n	%
1	22	36.6	5	6.6	13	31.7	4	2.2
2	2	3.3	4	5.3	2	4.8	4	2.2
3	7	11.6	11	14.6	6	14.6	18	10.1
4	7	11.6	14	18.6	--	----	15	8.4
5	7	11.6	12	16.0	15	36.5	58	32.7
6	1	1.6	15	20.0	2	4.8	63	35.5
7	2	3.3	--	----	1	2.4	1	.5
8	11	18.3	13	17.3	1	2.4	10	5.6
9	1	1.6	1	1.3	--	----	4	2.2
no inf.	--	----	--	----	1	2.4	--	----
Total	60	99.5	75	99.7	41	99.6	177	99.4

Position	All Ph.D.'s		All Ed.D.'s		Total Cases	
	n	%	n	%	n	%
1	56	18.9	39	7.4	95	11.6
2	17	5.7	14	2.6	31	3.7
3	35	11.8	70	13.3	105	12.8
4	44	14.9	39	7.4	83	10.1
5	51	17.2	167	31.9	218	26.6
6	39	13.2	144	27.5	183	22.3
7	4	1.3	4	.7	8	.9
8	46	15.5	36	6.8	82	10.0
9	2	.6	9	1.7	11	1.3
no inf.	1	.3	1	.1	2	.2
Total	295	99.1	523	99.3	818	99.5

*Key:

1. University professor of education, any level, in the 103 major institutions that grant doctoral degrees.
2. University professor, not in education, any level, in the 103 major institutions as above.
3. University professor of education, any level, not in the 103 major institutions.
4. University professor not in education, any level, not in 103 major institutions.
5. College or university administration and counseling, including deans, all major institutions.
6. High school or elementary school, any position except full-time research; department of education, local, state or federal.
7. Full-time research in education, all types of positions.
8. Industry, business or non-academic position--military, hospitals, church, associations, foundations.
9. Miscellaneous: retired, unemployed, etc.

(a) Present position. Table 13 gives a breakdown of the positions held at present by the total group of 818 doctors who received their degrees in 1954. Our primary concern is with the comparison of the group of doctors who published two or more research studies with the group who, by their own statement, had published no research.

For the Ph.D.'s only, 36.6 per cent of the research group held professional positions in the major institutions that grant doctoral degrees, whereas only 6.6 per cent of the no-research group held such positions. The corresponding data for the Ed.D.'s are 31.7 per cent for the research group and 2.2 per cent for the no-research group. The only other distinction between research and no-research groups comparable in size is that of the doctors who hold positions in school systems (category 6). Here only 1.6 per cent of the Ph.D.'s in the research group as compared with 20.0 per cent in the no-research group held such positions, whereas for the Ed.D.'s, the corresponding percentages were 4.8 and 35.5. The outstanding facts in Table 13 are, first, the preponderance of doctors doing research who held positions in major universities and, second, the small number of doctors from the research group in positions in school systems. As indicated in the totals in the lower section of the table, 18.9 per cent of all 295 Ph.D.'s held positions in departments of education in the group of major universities. For the research group, the per cent of Ph.D.'s who held positions in institutions of this type (36.6) was double that for the total group of Ph.D.'s, whereas for the no-research group the per cent in such institutions (6.6) was only a third of that for institutions as a whole. The per cent of Ph.D.'s in the research group holding such positions is six times the per cent of persons in the no-research group in these positions. For the Ed.D.'s the relationship is of the same order, only more marked. Of the entire group of 523 Ed.D.'s only 7.4 per cent hold positions in these major universities. However, 31.7 per cent of the research group are in such positions as compared with 2.2 per cent of the no-research group. In the Ed.D. research group there are fourteen times as many persons in these major universities positions as in the Ed.D. no-research group. It is apparent from Table 13, that the best opportunities for post-doctoral research are to be found in those major universities which offer graduate programs leading to the doctoral degree.

(b) First position following the doctor's degree. Table 14 is similar to the preceeding table except that it gives the data for the first position immediately following receiving the doctor's degree ten years ago rather than for the present position. Here again the influence of the major universities on research production is clear. For the Ph.D.'s, of those in the research group 21.6 per cent began their post-doctoral career in these institutions as compared with only 6.6 per cent of the no-research group. For the Ed.D.'s, the corresponding percentages are 36.5 and 5.0. Also for first position, the category where the no-research group is conspicuously larger than the research group is positions in school systems, where the percent in the no-research group is double the percent in the research group, being 25.3 and 11.6 for Ph.D.'s and 44.0 and 21.9 for the Ed.D.'s.

Category 7 in Table 14 is for full-time research positions. As indicated in the data for total cases at the bottom of the table, only 23 persons (2.8 per cent) held such positions in the first year following their degree. It is disturbing to note that only 8 of these same people ten years later held a position in this category. There may be full-time research positions at the sub-doctoral level for research technicians, but few of the 1954 doctors found opportunities in such positions. For the 1954 doctors who produced research during the ten years following their degree, well over 95 per cent of them held positions in which other activities in addition to research were involved such as, research and teaching or research and counseling. From the data in Tables 13 and 14, it appears that the best counsel for the young Ph.D. who wishes an opportunity for research is to get a professional position in a major institution where the climate is conducive to research.

(c) Number of years in first position following doctor's degree. Table 15 shows the number of years in the first position following the doctor's degree for the research, no-research, and total groups combined. An inspection of the table shows that a great many changes were made at the end of the first year and the second year, but also that a great many of these doctors stayed in the same position for the full ten year period.

TABLE 14

FIRST POSITION*OF 818 DOCTORS OF THE YEAR 1954 (Q. 63)

Position	Ph.D.				Ed.D.			
	Research		No Research		Research		No Research	
	n	%	n	%	n	%	n	%
1	13	21.6	5	6.6	15	36.5	9	5.0
2	3	5.0	6	8.0	2	4.8	4	2.2
3	8	13.3	10	13.3	7	17.0	29	16.3
4	9	15.0	17	22.7	--	----	22	12.4
5	3	5.0	5	6.7	5	12.1	21	11.8
6	7	11.6	19	25.3	9	21.9	78	44.0
7	7	11.6	2	2.6	3	7.3	2	1.1
8	9	15.0	10	13.3	--	----	10	5.6
9	--	----	--	----	--	----	1	.5
no inf.	1	1.6	1	1.3	--	----	1	.5
Total	60	99.7	75	99.8	41	99.6	177	99.4

Position	All Ph.D.'s		All Ed.D.'s		Total Cases	
	n	%	n	%	n	%
1	53	17.9	53	10.1	106	12.9
2	19	6.4	19	3.6	38	4.6
3	43	14.5	93	17.7	136	16.6
4	46	15.5	59	11.2	105	12.8
5	22	7.4	56	10.7	78	9.5
6	54	18.3	184	35.1	238	29.0
7	11	3.7	12	2.2	23	2.8
8	37	12.5	25	4.7	62	7.5
9	--	----	1	.1	1	.1
no inf.	10	3.3	21	4.0	31	3.7
Total	295	99.5	523	99.4	818	99.5

*Key:

1. University professor of education, any level, in the 103 major institutions that grant doctoral degrees.
2. University professor, not in education, any level, in the 103 major institutions as above.
3. University professor of education, any level, not in the 103 major institutions.
4. University professor not in education, any level, not in 103 major institutions.
5. College or university administration and counseling, including deans, all major institutions.
6. High school or elementary school, any position except full-time research; department of education, local, state or federal.
7. Full-time research in education, all types of positions.
8. Industry, business or non-academic position--military, hospitals, church, associations, foundations.
9. Miscellaneous: retired, unemployed, etc.

For the Ph.D.'s, 36.6 per cent stayed in their original position for a full ten years as compared with 48.0 per cent in the no-research group. The corresponding percents for the Ed.D.'s are 36.5 and 43.5. The greatest period of job mobility was at the end of the first and the second years following the degree. For the Ph.D.'s, 34.9 per cent of the research group had changed positions by the end of the second year, as compared with 24.0 per cent of the no-research group. For the Ed.D.'s, the corresponding percents are 31.6 and 31.6. On the whole there is somewhat more mobility in the research than in the no-research group during the first four years but the differences are not striking. Of greater interest than the number of years in a given position is the question of from what types of jobs and to what types of jobs do people move? In the Ph.D. and Ed.D. research groups combined there were 37 cases (22+15) who stayed on the initial job for a full ten year period. Fifteen of these positions were in major universities that carry on doctoral research programs. All but 8 of these 37 persons who stayed with their initial job for ten years were in a university or college position of some kind. Six persons in the research group started in major universities having doctoral programs but moved by the end of the second year; however, four of the six moved to other universities in the same major category, one went into military service, and the remaining one moved to a small college. It is evident therefore, that there is very little mobility away from positions in major first class institutions by persons who do productive research.

TABLE 15

NUMBER OF YEARS IN FIRST POSITION (Q. 63)

Number of Years	Ph.D. Research n	Ph.D. Research %	Ph.D. No Research n	Ph.D. No Research %	Ed.D. Research n	Ed.D. Research %	Ed.D. No Research n	Ed.D. No Research %
1	11	18.3	12	16.0	7	17.0	28	15.8
2	10	16.6	6	8.0	6	14.6	28	15.8
3	6	10.0	5	6.6	3	7.3	10	5.6
4	2	3.3	3	4.0	3	7.3	10	5.6
5	3	5.0	4	5.3	--	----	5	2.8
6	2	3.3	2	2.6	1	2.4	2	1.1
7	2	3.3	--	----	2	4.8	4	2.2
8	--	----	4	5.3	3	7.3	5	2.8
9	1	1.6	2	2.6	1	2.4	7	3.9
10	22	36.6	36	48.0	15	36.5	77	43.5
no inf.	1	1.6	1	1.3	--	----	1	.5
Total	60	99.6	75	99.7	41	99.6	177	99.6

Number of Years	All Ph.D.'s n	All Ph.D.'s %	All Ed.D.'s n	All Ed.D.'s %	Total Cases n	Total Cases %
1	59	20.0	85	16.2	144	17.6
2	39	13.2	68	13.0	107	13.0
3	22	7.4	40	7.6	62	7.5
4	12	4.0	30	5.7	42	5.1
5	11	3.7	23	4.3	34	4.1
6	10	3.3	11	2.1	21	2.5
7	6	2.0	10	1.9	16	1.9
8	6	2.0	10	1.9	16	1.9
9	6	2.0	13	2.4	19	2.3
10	114	38.6	212	40.5	326	39.8
no inf.	10	3.3	21	4.0	31	3.7
Total	295	99.5	523	99.6	818	99.4

In the no-research group there was a total, including both Ph.D.'s and Ed.D.'s, of 113 persons (36+77) who stayed in the initial position for a full ten year period. Only 7 of these 113 no-research people were in major research universities. Of the 74 persons in the no-research group who moved at the end of either the first or second year, only 2 had held positions in the list of major universities. One of these moved to go into military service, and the other moved to a different major institution. The greatest amount of mobility in both the research and the no-research groups was with persons holding positions in school systems. For the Ed.D.'s, approximately half of all the moves were in this category.

(d) Number of different positions in 10 years. Another index of job mobility is the number of different positions held in the ten years immediately following the doctor's degree. For the Ph.D.'s only, 13.2 per cent of the research group compared with 9.2 per cent of the no-research group moved to a different position more than twice during the 10 year period. The corresponding percents for the Ed.D.'s are 19.4 for the research group and 11.6 for the no-research group. The research group is somewhat more mobile than the no-research group. Thirty-nine per cent of the 818 doctors stayed in their first position for the entire ten-year period.

(e) Year of first appointment to major university. Of the Ph.D.'s, 38.2 per cent of those in the research group and 75.9 per cent of those in the no-research group never received an appointment to a major research university. For the Ed.D.'s, the corresponding percentages were 29.2 and 81.8. Most of those who did receive an appointment in a major university received it in the first year following their doctoral degree. In very few cases did an appointment to a major university come later than the third year following the award of the doctor's degree.

(f) Total number of years spent in major research universities. It has already been shown that there is a significant difference between the research and the no-research groups in respect to the number appointed to positions in major universities. A comparison was also made between the total number of years of experience in such institutions for the two groups. The data show that for the Ph.D.'s, 38.1 per cent of the research group as compared with 15.9 per cent of the no-research group had more than five years experience in these major universities, while for the Ed.D.'s, the corresponding per cents were 51.0 for the research group as compared with 8.8 for the no-research group. This statistically significant difference is but another fact to add to the accumulation of evidence supporting the importance of these major institutions in the total research productivity of the country.

(g) Year in which full professorship was reached. For the Ph.D.'s, 43.4 per cent of the research group as compared with 33.4 per cent of the no-research group reached the status of a full professorship within 10 years. For the Ed.D.'s, the corresponding per cents were 41.5 and 28.9. For the Ph.D.'s, 9.8 per cent of the research group, as compared with 17.3 per cent of the no-research group, reached full professorship within five years of the time of receiving their doctoral degree. For the Ed.D.'s, the situation was reversed, the corresponding percentages being 24.2 and 17.8. One should keep in mind that those who do no research have greater maturity and experience, which is often a factor in promotion.

2. Early post-doctoral publication. It is hypothesized here that the most productive researchers begin their research activity immediately after receiving the doctor's degree and bring out their first publication in the early years of their post-doctoral experience. Evidence bearing on this was obtained from the responses to item 46 of the questionnaire which asked, "Did you engage in research during the first year following your doctor's degree." For the Ph.D.'s, 60.0 per cent of the research group answered yes as compared with 20.0 per cent of the no-research group. For the Ed.D.'s, the corresponding per cents were 63.4 for the research group as contrasted with 14.1 for the no-research group. Additional evidence was supplied in the responses to item 58 which asked, "Did your work during the first year of your post-doctoral employment result in a published research article either then or since." Of the Ph.D.'s, 60.0 per cent of the research group answered yes as contrasted to 10.6 per cent for the no-research group. For the Ed.D.'s, the corresponding percentages were 75.6 for the research group and 10.1 for the no-research group. Here again there

is a statistically significant difference indicating the importance of an early beginning of research activities.

Another way of analyzing early and late publication is to combine group 1, those who published only one research study, with group 2, those who published two or more studies. There were 106 Ph.D.'s in this combined research group. Sixty-one of these persons published one or more research studies during the first three years following their doctor's degree, the average number of publications per person being 2.5. Nine persons from this same group published nothing during the first seven years following their doctor's degree but, in the last three years they published nine studies, an average of one study per person. For the Ed.D.'s, the corresponding number of research studies published per person was 2.6 for those who published during the first three years as compared with 1.2 for those who published nothing until the last three years. For the total group of Ph.D.'s and Ed.D.'s combined, those who published their first study during the first three years had an average of 2.6 studies per person for the ten year period, whereas for those who published their first study in the last three years, the average publications per person for the ten year period was 1.1. Whatever can be done during the first three post-doctoral years to provide a good climate and strong motivation for doing research would seem to pay off in terms of total productiveness.

3. Follow-up and persistence in research. Item 20 of the questionnaire asked, "Have you ever published a research study that was closely related to the subject of your doctor's dissertation." For the Ph.D.'s, 61.6 per cent of the research group answered yes, as compared with 13.3 per cent of the no-research group. The corresponding per cents for the Ed.D.'s were 63.4 and 12.9. This is a statistically significant difference between the two groups. A carefully done doctor's dissertation on a well chosen subject should open up rather than finish research possibilities in its field of study. Since all the persons in the no-research group stated in writing, when asked to list their research, that none had been published during the ten year period, it is evident that the research indicated here was published prior to their doctor's degree and may have been a pilot study related to their dissertation.

Item 29 of the questionnaire asked whether the respondent was working on a research project at the present time. For the Ph.D.'s, 80.0 per cent of the research group were working on a research project at the time of this study as compared with 22.6 per cent of the no-research group. The corresponding figures for the Ed.D.'s were 63.4 and 17.5. The percents reported by the research group indicate that a large portion of these persons are persisting in research at the end of the ten years following their doctor's degree.

4. Per cent of time spent in research. Item 42-2 of the questionnaire asked of those holding academic positions, "What per cent of your time is spent in (a) teaching, (b) research, (c) other duties?" The responses for the per cent of time spent in research are for the current year. For the Ph.D.'s only, 10.0 per cent of the research group compared with 69.0 per cent of the no-research group spent no time on research during this year. For the Ed.D.'s, the corresponding percents are 31.4 and 72.1. Only 35.4 per cent of the Ph.D.'s and 25.7 per cent of the Ed.D.'s in the research group gave as much as 30 per cent of their time to research. It is clear that, even of those who published research, only a minor part of their time is available for such activities. When the entire group of 223 Ph.D.'s who answered this item is included, 45.3 per cent of them reported no time spent on research and only 11.2 per cent spent as much as 30 per cent of their time carrying on research. This is the group that, in theory, is committed to increasing the fund of knowledge about education. In view of the limited time devoted to research it is not surprising that the total output of research publications is so small. For the total group of 383 Ed.D.'s who answered this item, 59.2 per cent spent no time in doing research and only 7.6 per cent spent as much as 30 per cent of their time in research work. Although these percents seem very small, it must be remembered that for the Ed.D. groups, professional contributions other than research are their primary commitment.

5. Systematic study or research during a sabbatical year. Item 62 of the

questionnaire asked, "Since receiving your doctor's degree, have you engaged in any refresher or up-grading activities related to your professional work, such as regular courses as in summer school, workshops or special seminars, or systematic study during a sabbatical leave?" Only the last of these showed a statistically significant difference between the research and the no-research groups. For the Ph.D.'s, 21.6 per cent of the research group compared to 6.6 per cent of the no-research group reported systematic study during a sabbatical leave. For the Ed.D.'s, the corresponding percents were 24.3 and 7.9. The sabbatical leave has peculiar advantages for research in that usually a person can detach himself completely from teaching and advising activities and from faculty committees thus leaving full time for concentrating on research and writing. Some plan for systematic use in research centers of persons on sabbatical leave might pay good dividends in research production.

6. Advisor load. Of the Ph.D.'s, 48.3 per cent of the research group and 72.0 per cent of the no-research group had no doctoral candidate advisees. For the Ed.D.'s, the corresponding percents were 53.6 and 84.7. For the Ph.D.'s, 34.9 per cent of the research group were advising from one to nine graduate students each as contrasted with 9.2 per cent in the no-research group. The corresponding percents for the Ed.D.'s were 29.1 for the research group and 3.3 for the no-research group. It is probably fortunate that so few students are being advised on their dissertations by faculty members who themselves have done no research since receiving the doctor's degree.

Seventy-four per cent of the 818 doctors reported that they were not serving as major advisor for any doctoral candidates during the current year. This means a heavy load for the remaining 25 per cent who do the advising. In view of the fact that more than 75 per cent of the entire group of doctors reported that work on their dissertation was of the highest value as preparation for doing research, it may be that the graduate dissertation advisors are doing their most important teaching when they are working with students on their dissertations. Yet, assignment as a dissertation advisor is often made as an extra duty with scant recognition of its real value in the training of educational researchers.

Summary. Six post-doctoral variables were found to be of special significance for future research production. (1) It is clear that the most favorable climate for doing research is in the major universities that confer doctoral degrees. Such positions attract more research-producing doctors than are found in any other category of positions. Among productive researchers there is strong mobility toward such institutions and few who hold such positions leave them. (2) The doctors who publish their first research within the three years following their degree are much more productive than those who delay their research activities. Serious consideration should be given to motivating and facilitating research during this early period. (3) There is a tendency among productive researchers to follow up the problem studied in the dissertation. Greater care in selecting dissertation topics that have possibilities for long-range study is warranted. (4) The per cent of time made available for research showed a marked difference between the research and the no-research groups. Programming time for research is especially desirable during the first few years following the doctor's degree when professional career patterns are being established. The per cent of time presently committed to research is entirely inadequate. (5) The data on use of a sabbatical year for research point to a potential source of research energy not greatly used at present. (6) More than 75 per cent of the 818 doctors rated work on the dissertation as having "great value" as training for educational research. In contrast, only 42 per cent of them rated research technique courses this high. There is reason to consider the advising on dissertations as of equal status to that enjoyed by courses, with appropriate recognition in assigning teaching load.

Research Productivity in Different Institutions

No attempt was made to compare one university with another in respect to research output of its graduates. One reason for this was that the data were drawn from a sample of one calendar year and, due to fluctuations from year to year, would not provide a reliable sample of individual institutions. Furthermore, it was not the purpose of the investigation to make a comparative study of different universities. However, certain general facts emerged that were significant and some comparisons of groups of institutions provided useful information, particularly in respect to the source of doctors in the research and no-research categories.

Sixty per cent of the persons in the research group (two or more research publications) came from ten universities, eight of which were state universities (Minnesota, Illinois, Michigan, California (Berkeley), Texas, Wisconsin, Indiana and Oregon) and two private institutions (Teachers College, Columbia, and New York University).

A comparison of public and private institutions as groups revealed some significant differences. There were 13 public universities that conferred more than 20 doctoral degrees each in the year 1954, and 10 private universities that conferred more than 10 degrees each. These two groups of institutions were compared in respect to the number of cases contributed to the research and no-research groups in this study. There were 249 doctors in the 13 publicly supported universities who returned questionnaires and 326 in the 10 private universities. Eighteen per cent of those from the public institutions were in the research group as compared with 8 per cent from the private universities. In the no-research group, the corresponding data were 25 per cent and 33 per cent. The number of Ph.D. degrees in the public group was 115 and in the private group 98. Based on Ph.D.'s only, 28 per cent of the doctors from the public universities and 13 per cent of those from the private ones were in the research group, compared with 21 per cent and 28 per cent in the no-research group. There were 134 Ed.D.'s from the public universities and 228 from the private group. Of the Ed.D.'s in the research group, 10 per cent were from public and 6 per cent from private institutions, while in the no-research group there were 28 per cent and 36 per cent respectively.

For Ph.D.'s, the ratio of research to no research is 4 to 3 in the public group but 1 to 2 in the private group. For the Ed.D.'s, the ratio of those in the research group to those in the no-research group is approximately 1 to 3 in the 13 public institutions but 1 to 6 in the 10 private institutions. These data, based on the two groups of larger public and private institutions are in agreement with the data, reported earlier in this chapter, based on all institutions.

In the study reported in Chapter 5 of this report, Dr. Heiss found that 61 per cent of her group of 31 outstanding researchers received their doctor's degree in privately supported institutions. The median year in which this group attained the doctoral degree was 1940, fourteen years earlier than for the doctors reported here. Although the number of cases is too small for generalization, they furnish straws which point to a trend, in quantity of research, toward publicly supported universities. Three items are worth noting. (1) The majority of the earleir group of 31 scholars were from private universities. (2) The majority of the 1954 group of researchers came from public universities. (3) During the decade from 1954 to 1964, the number of doctors reported in the present study increased from 55.0 per cent to 68.8 per cent in publicly supported institutions, while the per cent decreased from 44.2 to 30.8 in private universities. It should be noted that the data reported here are for quantity of research; no evidence was available for evaluating quality. In view of the preponderance of educational research carried on in privately supported institutions in the earlier period, serious study is needed as to the present level of research support provided for such universities at the present time.

Discriminant Analysis

The items in the questionnaire were necessarily selected without any assurance that they would prove valuable in differentiating between doctors who are or are not likely to be productive in research. For various reasons some of the questions contributed nothing to the study. For example, responses to question 16 indicated that only 2.0 per cent of the 1954 doctors and 3.3 per cent of those in 1964 had done graduate work outside of the United States, too small a number for any reliable comparison. Replies to questions 25 and 43 produced such a scattered list of names that no groupings were possible. Questions 44 and 45 were asked in the hope that some clear pattern of difference between research and no-research groups would be apparent in the associations to which they belonged and the journals that they read. No statistically significant differences appeared. In some cases there was more difference between the Ph.D.'s and Ed.D.'s than between the research and no-research groups. As would be expected, for membership in associations, A.P.A. and A.E.R.A. were at the top for the research group whereas P.D.K. and the N.E.A. ranked highest for the no-research group, but there was much overlapping. In dealing with the data two procedures were used. First, tests of significance of difference were applied to the variables that were usable. These data are summarized in Table A-3 in the Appendix. Second, a multivariate analysis was used with the data from the research and no-research groups.

In selecting items for the multivariate analysis a choice had to be made between number of variables used and the size of the sample that was available, since in such an analysis each variable must be represented for each case, the absence of data on one item meant that none of the data for that case could be used. One of the difficulties of the questionnaire method is that in a lengthy questionnaire some items will be omitted. This is not a serious matter for a discriptive analysis question by question, but where one hundred per cent of the items must be present it is a serious obstacle. A sample group of 102 Ph.D.'s was identified for which 18 significant variables were available for each person. Of this group of 102 doctors, 46 were from the research group and 56 from the no-research group. A discriminant analysis was made for these two groups, using a computer program (BMD04M). The essential data from the discriminant analysis are given in Table A-4 of the Appendix. The eighteen variables used are listed below in rank order:

Results of Multivariate Analysis

1. Still doing research in 10th year after doctors
*2. Published research done in first post-doctoral year
*3. Did research that followed-up dissertation
*4. No debt at time of doctor's degree
*5. Degree from public university
6. Number of student doctoral advisees
*7. Research assistant in department other than education
*8. Number of undergraduate courses in Education
*9. Age at doctor's degree
*10. Years with full-time job while studying for degree
*11. Research assistant in Center or bureau
12. Engaged in research first post-doctoral year
13. Years between first enrollment and doctor's degree
*14. Continuous full-time residence
*15. Per cent of time for research
*16. Total years on faculty of major university
17. Years of teaching/school experience
18. Published research prior to doctor's degree

As a result of the analysis, only six of the 102 Ph.D. cases were misclassified, all six of them in the no-research group. There were no misclassifications in the research group. Ninety-four per cent of the group was classified correctly on the basis of the 18 variables used with the Ph.D. cases. The same type of analysis was also applied to 174 Ed.D.'s, of whom 32 were in the research group and 142 in the no-research group. Here there were 11 misclassifications, of which 6 were in the research group and 5 in the no-research group. There were 94 per cent correctly classified, the same as for the Ph.D. group.

A second discriminant analysis was tried with 12 variables instead of 18, using only those marked with an asterisk in the preceding list. The sample was the same for the 18 variable analysis. For the 102 Ph.D.'s, there were 13 misclassifications, 4 being in the research group and 9 in the no-research group. Eighty-seven per cent of the group was classified correctly. For the 174 Ed.D.'s, there were 14 misclassifications, 4 in the research group and 10 in the no-research group. Here 92 per cent were correctly classified.

The pool of 18 variables, or even the pool of 12, taken as a group shows a very substantial agreement with the known record of research production of the sample tested. These variables furnish useful guidelines to point the direction for improvements in training for educational research. They furnish direction where choices are possible. For example, recruiting should try for young graduate students rather than older ones. Effort should be made to secure continuous full-time residence for the period of graduate study and the degree of support for students necessary to prevent carrying full-time jobs while doing part-time graduate work in evenings, Saturdays, and summers. Effort should be made to arrange the work load of young Ph.D.'s so that they can start a research career in their first post-doctoral year. Provision during the period of training should be made so that students may participate in research carried on by the faculty. Topics for doctoral dissertations should be chosen so that the problem studied will contain enticing possibilities for further post-doctoral research rather than terminate in small dead-end solutions. The data in the present chapter should contribute to more effective planning of programs for training in educational research.

CHAPTER III

THE STUDY OF THE 1964 DOCTORAL GROUP*

In the preceding chapter data from the doctoral class of 1954 were used so that the characteristics of the members of that group could be evaluated against a criterion of actual research production during the following ten year period. In the present chapter the data were obtained from the members of the most recent graduating class, those who received their doctoral degrees in the calendar year 1964. The data from this group were used for three purposes: First, to show the direction of change during the past ten years by comparing the responses of these two groups to the items on the first eight pages of the questionnaire, which were identical for both groups; second, for the 1964 group only, additional questions were added on pages nine and ten of the questionnaire to gather data on the present cost of doing graduate work; and third, to secure from this 1964 group a rather detailed statement about their doctoral dissertation which would afford a broad picture of the kinds of research which are now being accepted for the Ph.D. and Ed.D. degrees. Furthermore, it was thought that the results from the 1954 and 1964 groups might be filed and used as bench marks for evaluating changes that might occur in the training of educational researchers in the next five or ten years. A replication of the study at a later period would show whatever effects might result from the recommendations made in this study, in whatever degree they may induce changes in training practices.

The Sample Selected for the 1964 Study

The procedure in selecting the 1964 sample was the same as that followed for the 1954 group as described on the first page of Chapter 2. Returns were received from 99 of the 103 institutions that grant doctoral degrees in education. Of the four institutions not included, three granted no doctoral degrees in the year 1964 and the fourth one failed to reply to our inquiry. As noted in Table 16, a total of 1750 questionnaires were received in time to be included in the study. This was a return of 77.4 per cent of the valid cases reported by the universities, and 80.0 per cent of those for whom addresses were available and to whom questionnaires were mailed.

TABLE 16

THE SAMPLE OF DOCTORS IN THE 1964 GROUP

1.	Total number cases on lists from institutions	2432
2.	Number with addresses outside United States	131
3.	Number deceased	2
4.	Number in wrong year or not in Education	39
5.	Number valid cases remaining (Row 1 minus Rows 2+3+4)	2260
6.	Number for whom no correct address was available	71
7.	Number to whom questionnaires were mailed (Row 5 minus Row 6)	2189
8.	Number of questionnaires received (filled out)	1750
9.	Per cent returns of valid cases (Row 5)	77.4%
10.	Per cent returns of those who received questionnaire (Row 7)	80.0%

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*The study reported in this chapter was done by Guy T. Buswell.

The Questionnaire and Its Treatment

The questionnaire sent to the 1964 group included 11 pages, the first 8 of which were identical with those in the questionnaire sent to the 1954 group. The remaining 3 pages are shown in the appendix to this report. The method of dealing with the questionnaire returns was the same as for the 1954 group, with the exception of the fact that since these persons received their doctoral degree only last year and had no time to publish studies since receiving the degree, no classification could be made in terms of research production. Therefore, the data are presented only in terms of the total groups of 581 Ph.D.'s, 1169 Ed.D.'s, and the combined group of 1750 doctors. Tables of comparative data were made for the 1954 and 1964 groups on each item in the first eight pages of the questionnaire. In the section which follows, data will be presented relating first to those variables which, for the 1954 group were found to show significant differences between those who did research and those who did no research. Following this, additional data will be presented where there were sufficient differences between the 1954 and 1964 groups to warrant consideration. Following this comparative treatment there will be a short section dealing with costs based upon the additional questions included in the 1964 questionnaire. The third part of the study of the 1964 group proved to be of sufficient scope to warrant presenting it as a separate chapter and it will follow as Chapter 4, which will deal with the characteristics of the doctoral dissertations accepted in the year 1964. It has been prepared by Dr. Dorothy Knoell, a member of our research staff.

Comparative Data for the 1954 and 1964 Groups

Selection Variables

1. Age at the time of receiving the doctor's degree and factors associated with it. The mean ages for the 1954 and 1964 groups respectively were as follows: for the Ph.D.'s, 38.2 and 36.6; for the Ed.D.'s, 39.2 and 39.0; and for the total group, 38.8 and 38.2. The 1964 doctors were younger in each group but the amount is small. The mean age of the Ph.D.'s in 1964 was 2.4 years less than the mean age of the Ed.D.'s. However, the mean age of the combined group of doctors in 1964 was only 0.6 years below the mean for the 1954 group. In Chapter 2, a clear relationship was shown between age and research productivity, the younger group being much more productive than the older group. Data were also given showing the median ages at the time of receiving the doctoral degree in physical, biological, and social science groups. The median age reported for the year 1961 for the social sciences was 32.0 years. If departments of education continue at the same rate of change as is evidenced here for the last ten years it will be 103 years before the mean age of doctors in education is reduced to the median age reported for other social sciences, and it will be an additional 72 years before the mean age for education is reduced to the median age for the physical sciences which was 28.7 years. Departments of education have given lip service to the goal of a younger age for the doctoral degree for 30 years, yet no notable improvement in practice is apparent. The present situation in respect to age at the doctor's degree is completely indefensible.

The ages for the 1954 and 1964 groups, for those 32 or below and for those 40 or above at the time they received the doctoral degree are as follows: for the Ph.D.'s, the number of doctors 32 years of age or younger showed some increase, the per cent in this age group rising from 20.5 to 28.9; likewise for the Ph.D.'s, there was a reduction in the older age group from 39.9 per cent to 28.7 per cent. However, the mean reduction in age for the total Ph.D. group was less than 2 years. For the Ed.D.'s, the per cent in the younger group was slightly smaller in 1964 than it was ten years earlier; but for those in the above 40 group there was a reduction from 45.2 per cent to 39.7 per cent. Yet for the overall picture of Ed.D.'s, the mean age was reduced by only 0.2 years.

For the entire group of Ph.D.'s and Ed.D.'s, 20.9 per cent of the 1964 group received their degree at age 32 or younger. Only 138 of the 1750 doctors in education in 1964 received their degree by age 29. Thus 92 per cent of the doctors in education in the year 1964 were older than the median age of doctors in physical sciences.

Considering Ph.D.'s only, 79 persons in the 1964 group received their degree by age 29. Thus 86 per cent of the Ph.D.'s in education received their degree at a later age than the median age for Ph.D's in the physical sciences. In respect to age at receiving the doctoral degree in education, no substantial improvement has occurred in the ten years since 1954, the difference in mean ages for the total groups being only 0.6 years.

2. Late beginning of graduate work and low aspiration. Two prior factors which indirectly result in a late age at the doctoral degree are first, lateness in making a decision to do graduate work in education, and second, a low level of aspirations at the time such graduate work is begun. There has been no significant change since 1954 in the time when students first decide to study for a doctoral degree in education. In 1954, 80.6 per cent of the total group of doctors did not make the decision to do graduate work until after they had finished college, whereas in 1964, the per cent changed only to 81.3. In 1954, 66.9 per cent of the doctors entered graduate school with an objective of no more than a master's degree in education. By 1964 this had been reduced by only 0.5 per cent. In 1954, 21.2 per cent of the doctors entered with an original objective of securing a doctor's degree in education whereas in 1964 this had changed to 23.7 per cent. In both cases the changes were in a promising direction but the per cent of change was so small as to be of no significance. These data offer no support for present recruiting practices in education. The typical doctor in both 1954 and 1964 made a late decision to begin graduate work and, at the time the decision was made, revealed a level of aspiration for only a master's degree. Some basic change in recruiting seems to be necessary.

3. Amount of teaching or other school experience prior to receiving the doctor's degree. For the 1954 group, the amount of teaching experience was shown to have a significant but negative relation to research production in the ten years following the doctor's degree. As shown in Table 17, slightly fewer Ph.D.'s and approximately the same per cent of Ed.D.'s had no teaching experience at the time of receiving their doctor's degree. For those who had eleven or more years of experience prior to the degree, the per cent decreased from 34.5 to 32.8 for the Ph.D.'s but increased from 49.7 to 52.3 for the Ed.D.'s. All told, no significant change was found in the amount of teaching experience prior to the doctor's degree during this ten year period.

TABLE 17

TEACHING AND/OR OTHER SCHOOL EXPERIENCE BEFORE DOCTOR'S DEGREE, 1954 AND 1964 (Q. 8)

Number of Years	Ph.D.				Ed.D.				Total			
	1954		1964		1954		1964		1954		1964	
	n	%	n	%	n	%	n	%	n	%	n	%
none	25	8.4	30	5.1	12	2.2	27	2.3	37	4.5	57	3.2
1-5	86	29.1	195	33.5	102	19.5	213	18.2	188	22.9	408	23.3
6-10	81	27.4	162	27.8	147	28.1	315	26.9	228	27.8	477	27.2
11+	102	34.5	191	32.8	260	49.7	612	52.3	362	44.2	803	45.8
other	1	.3	3	.5	2	.2	2	.0	3	.3	5	.2
Total	295	99.7	581	99.7	523	99.7	1169	99.7	818	99.7	1750	99.7

4. Type of institution and major subject for bachelor's degree. As shown in Table 18, the strong tendency in 1954 to draw graduate students in education from the liberal arts undergraduate college of major research institutions was continued and increased in the year 1964. For the total group in 1954, 35.6 per cent of the doctors were from institutions of this type as compared with 40.1 per cent for the year 1964. There was a small decrease, from 6.7 per cent to 4.7 per cent in the number of students received from the select group of liberal arts colleges. There was a rather marked drop in the number of graduate students received from teacher's colleges, the decrease being from 12.1 to 4.8 per cent. This is in considerable part due to the fact that many teacher's colleges in the year 1954 were changed to state colleges with a liberal arts curriculum by 1964.

TABLE 18

INSTITUTION CONFERRING BACHELOR'S DEGREE, 1954 AND 1964 (Q. 21-1)

Institution*	Ph.D.				Ed.D.				Total			
	1954		1964		1954		1964		1954		1964	
	n	%	n	%	n	%	n	%	n	%	n	%
1	114	38.6	234	40.2	178	34.0	468	40.0	292	35.6	702	40.1
2	44	14.9	83	14.2	72	13.7	173	14.7	116	14.1	256	14.6
3	19	6.4	36	6.1	36	6.8	47	4.0	55	6.7	83	4.7
4	86	29.1	190	32.7	150	28.6	389	33.2	236	28.8	579	33.0
5	24	8.1	19	3.2	75	14.3	66	5.6	99	12.1	85	4.8
6	5	1.6	13	2.2	7	1.3	19	1.6	12	1.4	32	1.4
7	1	.3	3	.5	--	---	--	---	1	.1	3	.1
other	2	.6	3	.4	5	.8	7	.5	7	.8	10	.5
Total	295	99.6	581	99.6	523	99.5	1169	99.6	818	99.6	1750	99.2

*Institution:

1. Universities that confer doctoral degrees
2. Universities that do not confer doctoral degrees
3. Select group of 49 liberal arts colleges
4. Colleges not on select list
5. Teachers Colleges
6. Professional schools
7. Others, unclassified

As shown in Table 19 there was an increase in the number of doctors whose undergraduate major was education, and this was true for both Ph.D.'s and Ed.D.'s. For the group as a whole, the per cent of doctors with a major in education increased from 22.7 in 1954 to 30.4 in 1964. In other categories the changes were small except

TABLE 19

MAJOR SUBJECT FOR BACHELOR'S DEGREE, 1954 AND 1964 (Q. 21-2)

Subject*	Ph.D.				Ed.D.				Total			
	1954		1964		1954		1964		1954		1964	
	n	%	n	%	n	%	n	%	n	%	n	%
1	60	20.3	152	26.1	126	24.0	381	32.5	186	22.7	533	30.4
2	28	9.4	62	10.6	12	2.2	62	5.3	40	4.8	124	7.0
3	2	.6	7	1.2	4	.7	24	2.0	6	.7	31	1.7
4	4	1.3	7	1.2	12	2.2	19	1.6	16	1.9	26	1.4
5	53	17.9	68	11.7	120	22.9	164	14.0	173	21.1	232	13.2
6	55	18.6	95	16.3	106	20.2	160	13.6	161	19.6	255	14.5
7	55	18.6	118	20.3	83	15.8	200	17.1	138	16.8	318	18.1
8	34	11.5	66	11.3	48	9.1	150	12.8	82	10.0	216	12.3
other	4	1.2	6	.9	12	2.1	9	.7	16	1.8	15	.7
Total	295	99.4	581	99.6	523	99.2	1169	99.6	818	99.4	1750	99.3

*Subject:

1. Education
2. Psychology
3. Sociology
4. Economics
5. Other social sciences, including history
6. Physical and biological sciences; mathematics
7. Humanities
8. Other

for "other social sciences" where there was a decrease from 21.1 per cent to 13.2 per cent. There was a slight increase in doctors drawn from the undergraduate major of psychology. The trend over the decade toward more doctors with undergraduate majors in education and fewer with majors in the liberal arts departments is not promising in terms of future research production.

4. *Number of courses in education as an undergraduate*. Here again the overall changes are small. As shown in Table 20, in the case of the Ph.D.'s, 20.3 per cent in 1964 as compared with 16.2 per cent in 1954 had no courses in education as an undergraduate. In the case of the Ed.D.'s the reverse was true, fewer students in 1964 having no courses in education than in the year 1954. There was no significant change in the per cent who had 10 or more undergraduate courses in education.

TABLE 20

UNDERGRADUATE COURSES IN EDUCATION, 1954 AND 1964 (Q. 6)

Number of Courses	Ph.D.				Ed.D.				Total			
	1954		1964		1954		1964		1954		1964	
	n	%	n	%	n	%	n	%	n	%	n	%
none	48	16.2	118	20.3	75	14.3	138	11.8	123	15.0	256	14.6
1-3	36	12.2	76	13.0	43	8.2	135	11.5	79	9.6	211	12.0
4-6	90	30.5	169	29.0	140	26.7	330	28.2	230	28.1	499	28.5
7-9	52	17.6	101	17.3	118	22.5	229	19.5	170	20.7	330	18.8
10+	60	20.3	114	19.6	133	25.4	293	25.0	193	23.5	407	23.2
other	9	3.0	3	.5	14	2.5	44	3.6	23	2.7	47	2.6
Total	295	99.8	581	99.7	523	99.6	1169	99.6	818	99.6	1750	99.7

5. *Other selective factors*. Slightly more of the parents of the 1964 doctors had a college degree than was the case ten years earlier, the per cent of fathers who had graduated from college changing from 13.0 to 15.3, and for mothers from 8.7 to 9.6. The per cent with only an elementary school education in the case of the fathers dropped from 40.8 to 38.2, but in the case of the mothers, the drop was more substantial being from 38.1 to 29.4. It is significant to note that in the group of 1964 doctors more than 85 per cent of the parents had not graduated from college. Education is not recruiting heavily from the children of college graduates and this should be a matter of considerable concern.

One of the most striking changes during the decade was the marked increase in per cent of early marriages among doctors. The overall per cent of married doctors increased from 81.1 in 1954 to 83.6 in 1964, but the per cent of doctors who were married at the time of receiving their bachelor's degree, increased from 20.6 per cent in 1954 to 32.9 per cent in 1964. This is a very marked change as compared with doctors of 25 or 30 years ago and it has repercussions in terms of finance and housing of graduate students as well as interruptions in full-time residence, particularly where the number of dependents is large.

Changes in Program Variables from 1954 to 1964

1. *Research experience while a graduate student*. In Chapter 2 it was shown that experience in research while a graduate student was one of the significant characteristics of the productive research group as compared with the no-research group. For the Ph.D.'s, the number of doctors who had experience as a research assistant in a research bureau or center decreased during the ten years from 20.3 per cent to 16.6 per cent, and for the group as a whole, from 15.5 per cent to 13.2 per cent. For those who were research assistants to a professor, for the Ph.D.'s the number decreased from 23.7 per cent to 21.8 per cent, but for the Ed.D.'s it showed a corresponding rise of 2 per cent. The number who had no research experience during their doctoral program decreased from 41.3 per cent to 38.2 per cent for the Ph.D.'s, and from 50.2 per cent to 46.5 per cent for the Ed.D.'s. There was apparently a greater variety of possible research experiences in 1964 than was the case in 1954. In view of the desirability of research

experience as contrasted with only carrying courses, a marked increase in these opportunities would seem to be beneficial. The number of doctors who were research assistants in some department other than education showed approximately the same number for both years, being 23.3 per cent in 1954 and 22.9 per cent in 1964. Considering the striking changes in the support of research and the increased surge of interest in research projects during this decade, the increase in opportunities for research experience for graduate students is much less than would be expected.

2. Continuous full-time residence. Since this seems to be one of the crucial factors in training for educational research, the complete data for the years 1954 and 1964 are shown in Table 21. Although the per cent of doctors with continuous full-time residence of 18 months or more showed improvement, particularly in the case of the Ph.D.'s where the change was from 45.0 per cent in 1954 to 49.2 per cent in 1964, there is also a change in the opposite direction revealed in the number of those having less than one semester of full-time residence. The data in this respect show an increase in such persons, for the Ph.D.'s, from 14.5 per cent to 16.3 per cent, and for the Ed.D.'s, from 17.2 per cent to 23.3 per cent. Although the total group of Ph.D.'s and Ed.D.'s who were in continuous residence for two years or more shows a change of 2.2 per cent in the desired direction, this is accompanied by an even greater change of 4.8 per cent in the case of students who in 1964 were in full-time residence for less than one full semester. Thus the number doing only part-time study for their degree increased during the decade.

TABLE 21

CONTINUOUS FULL-TIME RESIDENCE, 1954 AND 1964 (Q. 14)

Months of Residence	Ph.D.				Ed.D.				Total			
	1954		1964		1954		1964		1954		1964	
	n	%	n	%	n	%	n	%	n	%	n	%
none	43	14.5	95	16.3	90	17.2	273	23.3	133	16.2	368	21.0
6	23	7.7	30	5.1	63	12.0	90	7.6	86	10.5	120	6.8
9	26	8.8	57	9.8	51	9.7	139	11.8	77	9.4	196	11.2
12	37	12.5	64	11.0	84	16.0	158	13.5	121	14.7	222	12.6
15	22	7.4	34	5.8	67	12.8	124	10.6	89	10.8	158	9.0
18+	133	45.0	286	49.2	149	28.4	356	30.4	282	34.4	642	36.6
other	11	3.7	15	2.5	19	3.5	29	2.4	30	3.6	44	2.5
Total	295	99.6	581	99.7	523	99.6	1169	99.6	818	99.6	1750	99.7

Table 22 shows the number of years that elapsed between enrolling for graduate work and receiving the doctor's degree for the 1954 and 1964 groups. The number of persons who secured their degree in three years or less from the time of first enrollment is

TABLE 22

YEARS ELAPSED BETWEEN FIRST ENROLLMENT AS A GRADUATE STUDENT AND DOCTOR'S DEGREE, 1954 AND 1964 (Q. 13-1)

Years	Ph.D.				Ed.D.				Total			
	1954		1964		1954		1964		1954		1964	
	n	%	n	%	n	%	n	%	n	%	n	%
2	7	2.3	10	1.7	9	1.7	36	3.0	16	1.9	46	2.6
3	20	6.7	54	9.2	21	4.0	60	5.1	41	5.0	114	6.5
4	29	9.8	70	12.0	53	10.1	99	8.4	82	10.0	169	9.6
5	42	14.2	62	10.6	61	11.6	93	7.9	103	12.5	155	8.8
6-10	110	37.2	236	40.6	189	36.1	457	39.0	299	36.5	693	39.6
11+	84	28.4	148	25.4	186	35.5	421	36.0	270	33.0	569	32.5
other	3	1.0	1	.1	4	.7	3	.1	7	.8	4	.1
Total	295	99.6	581	99.6	523	99.7	1169	99.5	818	99.7	1750	99.7

slightly more in 1964 than in 1954, but at the other extreme, the per cent who took six years or more to finish the work for their degree was larger in 1964 than in 1954.

Since the principal cause of elapsed time between degrees is the holding of full-time jobs while doing part-time graduate work, the data for years with a full-time job are shown in Table 23. Here there is no significant change in the percents of students who are not holding full-time jobs. The number of persons who held a full-time job for five years or more during the period in which they were doing graduate work increased from 61.8 per cent for the total 1954 group, to 64.2 per cent for the total 1964 group. Here again the very small changes over the decade in factors which are of great significance in carrying on doctoral programs can be explained only in terms of complacency with things as they are. There is no indication of any vigorous program to motivate graduate students in education to begin their graduate work earlier, to put in full-time residence while doing it, and to take their degrees at an age enough earlier to provide a long career for productive research and teaching.

TABLE 23

NUMBER OF YEARS WITH A FULL-TIME JOB WHILE A GRADUATE STUDENT, 1954 AND 1964 (Q. 13-2)

Years	Ph.D.				Ed.D.				Total			
	1954		1964		1954		1964		1954		1964	
	n	%	n	%	n	%	n	%	n	%	n	%
none	34	11.5	69	11.8	30	5.7	77	6.5	64	7.8	146	8.3
1	22	7.4	44	7.5	14	2.6	46	3.9	36	4.4	90	5.1
2	24	8.1	41	7.0	29	5.5	64	5.4	53	6.4	105	6.0
3	24	8.1	50	8.6	48	9.1	67	5.7	72	8.8	117	6.6
4	22	7.4	54	9.2	55	10.5	96	8.2	77	9.4	150	8.5
5+	167	56.6	317	54.5	339	64.8	808	69.1	506	61.8	1125	64.2
other	2	.6	6	.9	8	1.5	11	.7	10	1.2	17	.8
Total	295	99.7	581	99.5	523	99.7	1169	99.5	818	99.8	1750	99.5

3. Courses in statistics, methods of research, and college mathematics. Although the difference in the total number of courses taken in these three areas was shown in Chapter 2 to have no significant relationship to research production, no one would deny that some sophistication in research methodology and statistics is necessary for most kinds of research done in the field of education.

In the case of research methodology, as shown in Table 24, there was an increase in such courses as indicated by the fact that in 1954, 16.6 per cent of the total group had taken none of these courses, whereas in 1964, 12.3 per cent had none. Furthermore, for the total group, the number of persons who had two or more courses in research methodology increased from 35.5 per cent in 1954 to 46.4 per cent in 1964. Curiously, the per cent of doctors taking two or more methodology courses was slightly greater

TABLE 24

NUMBER OF COURSES IN RESEARCH METHODOLOGY, 1954 AND 1964 (Q. 27)

Number of Courses	Ph.D.				Ed.D.				Total			
	1954		1964		1954		1964		1954		1964	
	n	%	n	%	n	%	n	%	n	%	n	%
none	50	16.9	90	15.4	86	16.4	126	10.7	136	16.6	216	12.3
1	143	48.4	237	40.7	238	45.5	474	40.5	381	46.5	711	40.6
2	82	27.7	179	30.8	139	26.5	417	35.6	221	27.0	596	34.0
3	11	3.7	43	7.4	32	6.1	101	8.6	43	5.2	144	8.2
4+	6	2.0	28	4.8	21	4.0	46	3.9	27	3.3	74	4.2
other	3	1.0	4	.6	7	1.1	5	.3	10	1.1	9	.4
Total	295	99.7	581	99.7	523	99.6	1169	99.6	818	99.7	1750	99.7

in 1964 for the Ed.D.'s, than for the Ph.D.'s, and the increase over the ten year period was greater for the Ed.D.'s than for the Ph.D.'s, in spite of the fact that the Ed.D. degree is defined as a professional degree and the Ph.D. as a research degree. Since the per cent of Ed.D.'s doing research is much smaller than the per cent of Ph.D.'s. doing research, as revealed in Chapter 2, it may be that the number of Ed.D.'s who took research methods courses in order to help in the interpretation of research may obscure the relationship of such courses to research production.

In the case of courses in statistical methods, the situation is quite similar to that for research methodology. As shown in Table 25, fewer doctors in both the Ph.D. and Ed.D. groups had no courses in statistical methods in 1964 as compared with 1954. Slightly more of the 1964 doctors had two or more courses in statistics as compared with the 1954 group, the percents being 68.9 for 1954 and 70.9 for 1964.

TABLE 25

NUMBER OF COURSES IN STATISTICAL METHODS, 1954 AND 1964 (Q. 26)

Number of Courses	Ph.D.				Ed.D.				Total			
	1954		1964		1954		1964		1954		1964	
	n	%	n	%	n	%	n	%	n	%	n	%
none	28	9.4	39	6.7	38	7.2	69	5.9	66	8.0	108	6.1
1	65	22.0	109	18.7	118	22.5	279	23.8	183	22.3	388	22.1
2	106	35.9	181	31.1	207	39.5	462	39.5	313	38.2	643	36.7
3	48	16.2	102	17.5	111	21.2	253	21.6	159	19.4	355	20.2
4+	47	15.9	146	25.1	46	8.7	99	8.4	93	11.3	245	14.0
other	1	.3	4	.6	3	.5	7	.5	4	.4	11	.6
Total	295	99.7	581	99.7	523	99.6	1169	99.7	818	99.6	1750	99.7

For courses in college mathematics, the per cent of the total group of doctors who had no such courses (Table 26) increased from 25.1 for 1954 to 28.4 per cent in 1964. For those who had three or more courses in college, mathematics, there was a decrease for the total group from 39.3 per cent in 1954 to 31.7 per cent in 1964. At a time when statistical methods are becoming more sophisticated it seems unfortunate to find fewer doctors in education taking college mathematics than was the case ten years ago.

TABLE 26

NUMBER OF COURSES IN COLLEGE MATHEMATICS, 1954 AND 1964 (Q. 28)

Number of Courses	Ph.D.				Ed.D.				Total			
	1954		1964		1954		1964		1954		1964	
	n	%	n	%	n	%	n	%	n	%	n	%
none	77	26.1	165	28.3	129	24.6	332	28.4	206	25.1	497	28.4
1	47	15.9	93	16.0	72	13.7	221	18.0	119	14.5	314	17.9
2	54	18.3	128	22.0	106	20.2	246	21.0	160	19.5	374	21.3
3	30	10.1	53	9.1	56	10.7	116	9.9	86	10.5	169	9.6
4+	82	27.7	138	23.7	154	29.4	249	21.3	236	28.8	387	22.1
other	5	1.6	4	.6	6	1.0	5	.4	11	1.3	9	.5
Total	295	99.7	581	99.7	523	99.6	1169	99.9	818	99.7	1750	99.8

4. Master's thesis. Fewer than half of the 1964 doctors in education wrote a master's thesis. In 1954, 54.6 per cent wrote a thesis, whereas in 1964, only 43.7 did so. The drop was shared equally by the Ph.D.'s and the Ed.D.'s. For those who did write a master's thesis there was also a drop in the number of persons who gathered original data for their study. In 1954 the per cent of those who wrote theses which were based upon the collection and analysis of a body of original data was 44.3 as compared to 34.2 in 1964. With less than half of the 1964 doctors writing a master's thesis, and of those who did only a third collecting and analyzing evidence as is done in most educational research, it is apparent that five out of six of the persons who

took a doctor's degree in 1964 did not have the training experience provided by doing a research type of master's thesis. As far as training for educational research is concerned, it is no longer realistic to think of the master's thesis as a major factor in providing research experience prior to the beginning of the doctor's dissertation.

5. Doctoral degree from public or private university. There has been a striking change in the per cent of doctors who secured their degree in public universities as contrasted with privately supported universities. For the Ph.D.'s, the change during this decade was from 59.3 per cent in 1954 to 70.0 per cent in 1964. For the Ed.D.'s, the change was from 52.5 per cent to 68.1 per cent. For the entire group of doctors in both samples, the change was from 55.0 per cent in publicly supported institutions in 1954 to 68.8 per cent in such institutions in 1964.

6. Sub-field of education. As shown in Table 27, there have been some interesting changes in the sub-fields of education in which doctor's degrees were conferred. In 1954, 15.5 per cent of the Ph.D.'s were in educational administration as contrasted with 18.0 per cent in 1964, whereas for the Ed.D.'s, the shift was from 39.9 per cent in 1954 to 31.1 per cent in 1964. In the case of educational psychology, there has been a small drop for Ph.D.'s, from 19.6 per cent in 1954 to 15.8 per cent in 1964, whereas for the Ed.D. degree, there has been a small increase from 5.1 per cent to 6.4 per cent.

TABLE 27

SUB-FIELD OF EDUCATION, 1954 AND 1964 (Q. 4)

Sub-field	Ph.D.				Ed.D.				Total			
	1954		1964		1954		1964		1954		1964	
	n	%	n	%	n	%	n	%	n	%	n	%
Educ. Admin.	46	15.5	105	18.0	209	39.9	364	31.1	255	31.1	469	26.8
Educ. Psych.	58	19.6	92	15.8	27	5.1	75	6.4	85	10.3	167	9.5
Curriculum	20	6.7	39	6.7	46	8.7	133	11.3	66	8.0	172	9.8
Counseling	39	13.2	79	13.5	35	6.6	110	9.4	74	9.0	189	10.8
Ed. Methods	5	1.6	11	1.8	11	2.1	15	1.2	16	1.9	26	1.4
Hist. Educ.	2	.6	5	.8	3	.5	5	.4	5	.6	10	.5
Phil. Educ.	11	3.7	14	2.4	8	1.5	7	.5	19	2.3	21	1.2
Educ. Socio.	4	1.3	7	1.2	1	.1	17	1.4	5	.6	24	1.3
Other	80	27.1	189	32.5	134	25.6	336	28.7	214	26.1	525	30.0
other	30	10.0	40	6.8	49	9.3	107	9.0	79	9.5	147	8.4
Total	295	99.3	581	99.5	523	99.4	1169	99.4	818	99.4	1750	99.7

The field of curriculum shows no change for the Ph.D.'s, but a shift from 8.7 per cent to 11.3 per cent for the Ed.D.'s. Likewise in counseling, no significant change appears for the Ph.D.'s, the percents being 13.2 and 13.5 for the two periods, but for the Ed.D.'s there has been an increase of from 6.6 per cent in 1954 to 9.4 per cent in 1964. The rather large group classified as "Other" at the foot of the table includes a considerable number in physical education and clinical psychology, as well as some who classified themselves in educational levels such as secondary education or higher education rather than in the categories listed in the table.

7. Amount of debt at the time of securing the doctor's degree and sources of income. The per cent of students in debt at the time of receiving their doctor's degree increased from 18.9 in 1954 to 33.4 in 1964. The most significant change in source of income was in support from the G. I. Bill. In 1954 there were 57.9 per cent of the group for whom this was a principal source of income as compared with only 17.8 per cent in 1964. In view of the fact that nearly twice as many doctors were in debt for their education in 1964 as in 1954, some substitute for the support supplied by the G. I. Bill is evidently needed.

8. Courses in departments other than education. Item 48 of the questionnaire asked "How many courses did you take that were outside the department of education". In general, slightly fewer courses were taken in other departments in 1964 than in 1954. The number who took no outside courses increased from 8.3 per cent in 1954 to 9.2 in 1964, while the number who took 10 or more courses in outside departments showed no change, the percents for 1954 and 1964 being 42.5 and 42.6. It should be noted, however, that nearly half of the doctors in both years carried 10 or more courses other than education which provides a considerable amount of breadth.

Post-doctoral Variables

The only post-doctoral variables for which a 1954 versus 1964 comparison is possible at the present date was the first position following the doctor's degree. A comparison of first positions for the 1954 and 1964 groups is shown in Table 28.

TABLE 28

FIRST POST-DOCTORAL POSITION, 1954 AND 1964 (Q. 63 AND 2)

Position*	Ph.D.				Ed.D.				Total			
	1954		1964		1954		1964		1954		1964	
	n	%	n	%	n	%	n	%	n	%	n	%
1	53	17.9	122	20.9	53	10.1	142	12.1	106	12.9	264	15.0
2	19	6.4	31	5.3	19	3.6	28	2.3	38	4.6	59	3.3
3	43	14.5	111	19.1	93	17.7	240	20.5	136	16.6	351	20.0
4	46	15.5	64	11.0	59	11.2	113	9.6	105	12.8	177	10.1
5	22	7.4	67	11.5	56	10.7	115	9.8	78	9.5	182	10.4
6	54	18.3	95	16.3	184	35.1	399	34.1	238	29.0	494	28.2
7	11	3.7	29	4.9	12	2.2	31	2.6	23	2.8	60	3.4
8	37	12.5	54	9.2	25	4.7	87	7.4	62	7.5	141	8.0
9	--	---	5	.8	1	.1	4	.3	1	.1	9	.5
other	10	3.3	3	.5	21	4.0	10	.8	31	3.7	13	.7
Total	295	99.5	581	99.5	523	99.4	1169	99.5	818	99.5	1750	99.6

*Position:

1. University professor of education, any level, in the 103 major institutions that grant doctoral degrees.
2. University professor, not in education--any level, in the 103 major institutions.
3. University professor of education, any level, not in the 103 major institutions.
4. University professor not in education, not in 103 major institution.
5. College or university administration and counseling, including deans, all institutions.
6. High school or elementary school-any position except full-time research; departments of education, state or federal.
7. Full-time research in education, all types of positions.
8. Industry, business or non-academic position--military, hospitals, minister, associations, foundations.
9. Miscellaneous, retired, unemployed.

The per cent of doctors who began their career as a university or college professor of education increased during the ten year period, but the number of doctors in education teaching other college subjects decreased. For the Ph.D.'s, the percent who began as an administrator or counselor at the college level increased from 7.4 to 11.5 but the Ed.D.'s in such positions decreased slightly from 10.7 to 9.8. There was a small decrease for both degrees in the percent entering positions in schools below the college level. The number entering full-time research positions is still small, the change being from 2.8 per cent in 1954 to 3.4 per cent in 1964. All of the changes are small, the distribution of first positions in 1964 being substantially like that of ten years earlier.

Student Costs for Graduate Study

One index of the financial load of graduate study is the amount of debt carried by students. The percent of students who were in debt at the time of receiving the doctor's degree in education increased from 18.9 per cent in 1954 to 33.4 per cent in 1964. Not only were nearly twice as many in debt in 1964 but also the amount of indebtedness increased. The percent of doctors who were in debt by an amount equal to 10 per cent of their next year's income increased from 6.1 per cent in 1954 to 14.7 per cent in 1964, and the corresponding numbers who were in debt by 25 per cent of their next year's income increased from 5.7 per cent to 11.7 per cent. Although more doctors in 1964 were in debt and by a greater amount than in 1954, it should be noted that 80.5 per cent of the total group in 1954 and 66.1 per cent in 1964 had no debt when they received the degree. However, many of these persons were able to stay out of debt only by carrying full-time jobs while they studied part time for the doctor's degree. One of the principal reasons for recommending greater support for graduate students in education is to make possible full-time continuous residence in the research climate of a university.

Item 40 in the questionnaire asked for a check of the two principal sources of support for the student's doctoral work. Table 29 gives the data for this question for the total groups for 1954 and 1964. For the 1964 group of doctors, the most frequently mentioned source of support was aid from research or teaching assistantships.

TABLE 29

COMPARISON OF 1954 AND 1964 GROUPS AS TO TWO MOST IMPORTANT MEANS OF SUPPORT - (FIRST PLUS SECOND MOST IMPORTANT)

Code on Q. 40*	Ph.D.				Ed.D.				Total			
	1954		1964		1954		1964		1954		1964	
	n	%	n	%	n	%	n	%	n	%	n	%
1	127	43.0	269	46.2	142	27.1	419	35.7	269	32.8	688	39.2
2	166	56.2	91	15.6	309	59.0	222	18.9	475	57.9	313	17.8
3	4	1.2	84	14.4	2	.2	96	8.1	6	.6	180	10.2
4	22	7.4	83	14.2	43	8.1	131	11.1	65	7.8	214	12.1
5	56	18.9	141	24.1	77	14.6	268	22.8	133	16.2	409	23.3
6	10	3.3	23	3.9	14	2.6	50	4.1	24	2.8	73	4.1
7	48	16.2	97	16.6	102	19.4	297	25.4	150	18.3	394	22.4
8	11	3.6	50	8.5	41	7.7	136	11.5	52	6.3	186	10.5
9	37	12.4	74	12.7	59	11.2	130	11.1	96	11.6	204	11.6
10	72	24.3	161	27.6	154	29.3	382	32.6	226	27.5	543	30.9
11	30	10.1	76	13.0	88	16.8	176	15.0	118	14.4	252	14.4
other	7	2.2	13	2.3	15	2.8	31	2.6	22	2.6	44	2.5
Total	590	198.8	1162	199.1	1046	198.6	2338	198.9	1636	198.8	3500	199.0

*Key:

1. Teaching or research assistantship
2. G. I. Bill
3. Government fellowship or scholarship
4. Other fellowship or scholarship
5. Spouse's job
6. Parents' aid or spouse's parents' aid
7. Withdrew savings
8. Borrowed money
9. Part-time work
10. Income from investments
11. Other (please describe)

In order of frequency, the next three most important sources were income from investments, spouse's job, and use of savings, all of them being self-help or family help. Next in importance was assistance from the G. I. Bill, which dropped from 57.9 per cent in 1954 to 17.8 per cent in 1964. Unless this type of support is renewed it will soon cease to be available. The only additional forms of outside support were fellowships or scholarships from government (10.2 per cent) or from other sources (12.1 per cent).

The data in Table 29 were for the two principal sources of support. Assistance in lesser amounts was also received by many students and these are indicated for the 1964 doctors in Table 30, which gives the number of "yes" responses to item 58 in the questionnaire. It should be remembered that many of these stipends are small in amount and for limited periods of time. This is particularly true of the outright grants, many of which cover only tuition costs. Fewer doctors were research assistants (19.5 per cent) than were teaching assistants (26.2 per cent) although, as noted in Chapter 2, experience as a research assistant was the more valuable of the two in relation to future research productivity. Only 5.4 per cent of the group received stipends involving repayable loans.

TABLE 30

TYPES OF STIPENDS RECEIVED BY 1964 DOCTORS (Q. 58)

Classification	Total n	"Yes" Responses %
1. Research assistant	342	19.5
2. Teaching assistant	459	26.2
3. Grants, no service	568	32.4
4. Loan stipends	96	5.4
5. Counseling aid	49	2.8
6. Work as reader, etc.	193	11.0
7. Administrative aid	49	2.8
8. For tuition and fees	52	2.9
9. Miscellaneous aid	46	2.6

The sources of the stipends received and the percents from each source were: university funds. 47.4 per cent; U. S. Government, 24.0 per cent; foundations, 11.6 per cent; and miscellaneous sources, 11.8 per cent. Universities are the most common source of assistance through stipends.

Item 61 of the questionnaire asked for the amount of stipends given for the specific cost of the dissertation. Only 15.3 per cent of the doctors in 1964 received such financial aid, in half of the cases the amount being under $500.00. However, 2.6 per cent of the doctors received stipends for their dissertations of $2,000.00 or more.

Ten per cent of the 1750 doctors in the year 1964 were offered stipends which they refused. Many more than this applied for stipends which were not granted. In 13.7 per cent of the cases from one to four applications were rejected. Eleven persons had from 5 to 8 applications rejected, while 5 persons made 9 or more applications which were rejected. There is great variation in the kinds of stipends available to graduate students in education, with the monetary value of the stipends bearing little relation to the duties attached to them. However, the available number of research assistantships, teaching assistantships, and other fellowships is so small that most students in education receive none of them. This is in marked contrast to some of the other departments, especially in the sciences.

Since more than 80 per cent of the doctors in 1964 were married at the time of receiving the degree, the number of dependents to be supported was large. Only 17.1 per cent of these 1750 doctors had no dependents. The average number of dependents for the entire group was 2.7. A third of the group had 4 or more dependents each. In many cases the cost of maintaining the family was greater than the direct costs for education. The combined educational and living expenses for the most recent year in which the person was a full-time student is shown in Table 31. The median expense for 12 months falls in the interval of $5,000 to $5,999. Approximately 10 per cent of the group spent less than $3,000 per year while 11.9 per cent spent $8,000 or more.

TABLE 31

TOTAL EXPENSES FOR 12 MONTHS FOR 1964 GROUP

Amount	Total Ph.D.		Total Ed.D.		Total Ph.D. & Ed.D.	
	n	%	n	%	n	%
Under $2,000	28	4.8	46	3.9	74	4.2
2,000-2,999	34	5.8	58	4.9	92	5.2
3,000-3,999	63	10.8	107	9.1	170	9.7
4,000-4,999	89	15.3	154	13.1	243	13.8
5,000-5,999	89	15.3	187	15.9	276	15.7
6,000-6,999	75	12.9	146	12.4	221	12.6
7,000-7,999	49	8.4	74	6.3	123	7.0
8,000 or more	56	9.6	153	13.0	209	11.9
other	98	16.8	244	20.8	342	19.5
Total	581	99.7	1169	99.4	1750	99.6

In the table for the two principal sources of support, use of savings was listed by 22.4 per cent of the group and income from investments by 30.9 per cent. These sources of support are available only for older students who have held full-time jobs for enough years to accumulate savings. Yet, the evidence is clear that younger students have the most promise for future research production. With the costs of education at the present level, the only possible way to get young graduate students is to subsidize them in some way. The only alternative for them is to become part-time students while holding outside jobs to pay for their education. This alternative means sacrificing the stimulation of living full time in a research climate and concentrating all their energy on graduate study. In respect to the amount and quality of research production, it would seem to be sound public policy to provide research assistantships for young students who are willing to commit three years of full-time study to earning a doctor's degree. It is more wasteful to maintain expensive university programs for large enrollments of older part-time students than to provide support for a smaller group of young full-time students.

Summary

This chapter must end on a disturbing note. The comparison of the 1954 and 1964 groups of doctors in education reveals a remarkable degree of similarity. It should be remembered that this study deals only with research; it gathered no evidence as to change relating to the areas of teacher education and professional service. Yet, research is the life blood of any enterprise, and it is difficult to conceive of growth in the professional side of education without the stimulation of new knowledge resulting from research. For the 1954 group of doctors the study has reported the research production for the ensuing decade. There has been some excellent research and a few impressive individual records. But only one fourth of the 818 doctors in this group have a record of published research and half of these have published only one research study in ten years.

In Chapter 2 variables were identified which differentiated the research and no-research groups of doctors. Those variables that were associated with research production might be considered as criteria for evaluating the changes from 1954 to 1964. A vigorous development of training for research during these ten years should be evidenced by positive differences in the 1964 group of doctors. The plain fact is that no such evidence of vigorous growth is apparent in the data. The following is a rapid survey of the changes.

On the positive side there are some encouraging factors. The educational background in the homes is higher at the end of the ten year period, more parents having college degrees and fewer having only an elementary school education. There was a reduction of 6.9 per cent in the number of doctors who had attended four or more summer sessions. Although there was no significant change in the number of statistics courses taken, there was a marked increase in the sophistication of the courses as revealed by the percent of doctors who were taught specific topics. For example, the percent of those who were taught analysis of variance increased from 46.2 to 67.5, multivariate analysis from 15.8 to 32.9, non-parametric techniques from 11.1 to 44.7, experimental design from 11.1 to 44.7, and computer programming from 0.9 to 10.9. These are substantial gains in the ten year period. The number of doctors from publicly supported institutions increased from 55.0 per cent to 68.8 per cent, which means a significant upgrading of graduate programs in these institutions.

Accompanying these changes in a positive direction are others which are in the negative direction. The number of doctors in debt at the time of their degree increased from 18.9 per cent to 33.4 per cent, and the amount of indebtedness also increased. The number of students supported by the G. I. Bill dropped more than was off-set by other government stipends. The various forms of self and family support increased leaving less time for graduate work. There was a marked increase from 20.6 per cent to 32.9 per cent in the number of students married at the time of receiving the bachelor's degree, followed by an increased number of dependents. The economic position of students who studied for the doctor's degree in 1964 was less favorable than 10 years earlier. Other factors also show a change in the negative direction. There has been a drop in the percent of 1964 doctors who majored as an undergraduate student in social and natural sciences and increase in the percent who majored in education, thus narrowing the liberal arts base for graduate specialization.

In addition to the variables mentioned above there was a longer list where the changes over the ten years were so small that the situation in respect to them can best be described as static. Although the age retardation of doctors in education has long been deplored, the change in mean age of doctors over the decade was 0.6 years. The number of doctors of age 32 or younger increased by only 2.4 per cent. The types of first positions following the doctors degree changed by less than 4 per cent in any of the nine categories. The amount of teaching experience changed by less than 2 per cent. The number of research assistants to a professor or in a bureau changed by less than 1.0 per cent. The number who published research prior to receiving the doctor's degree decreased by 1.8 per cent. The net change in amount of continuous full-time residence was close to zero. The change in elapsed time between first enrollment and receiving the doctor's degree was less than 1 per cent. Four per cent fewer doctors in 1964 were invited to the home of their dissertation advisor. Nine per cent fewer in 1964 belonged to a departmental club. The percent entering an academic position following the award of the degree was exactly the same for the two groups. The list could be extended. In general, the 1964 doctors resembled the 1954 group in the variables studied in this investigation. Unless some new post-doctoral factors are introduced promptly there is little reason to expect any different record of research production from the 1964 group than for the 1954 group except for the important addition of greatly augmented research funds. But the training background of those who will use these resources is more like than different from that of the 1954 doctors.

There is no reason other than inertia why the forthcoming decade should not be different. Many elements of a pattern for improvement are known. Whether the vigor to produce constructive change will be found in schools of education or in new interdisciplinary groups remains to be seen. The recommendations in Chapter 1 open the way for either or both groups to move ahead.

CHAPTER IV

A CRITICAL ANALYSIS OF THE DISSERTATION RESEARCH*

Introduction

Recipients of the doctoral degree in education in 1964 were asked to provide certain information about their dissertation research, using the following outline:

1. The title of the dissertation;
2. A brief description of the procedures followed;
3. The kinds of evidence (data) collected and size of the sample obtained;
4. Methods used in obtaining the data;
5. Design of the study, if experimental;
6. Statistical techniques employed in analyzing the data or testing the hypotheses;
7. Use of computer in processing the data.

Some respondents sent a copy of their dissertation abstract, sometimes in lieu of providing the information requested in the questionnaire. A total of 1598 respondents supplied a sufficient amount of information to make possible some analysis of methodology and general content or problem studied. Dissertations were not analyzed which clearly had no relevance for education in its broadest sense, e.g., literary research by college teachers of English.

The major questions around which the analysis was planned were ones of research methodology, problem areas investigated, sampling, and statistical techniques employed. Analyses were made in an attempt to answer the following questions:

1. Does dissertation research for the Ph.D. and Ed.D. degrees differ with respect to methodology, types of problems investigated, and sophistication of design or statistical treatment?
2. Are these differences among the fields in which the degree in education was awarded with respect to methodology and design, e.g., do students in administration have a greater tendency to use normative survey, rather than experimental methods, than students in curriculum?
3. What proportion of the dissertations might be classified as experimental, quasi-experimental, normative, descriptive, and non-quantitative in design? To what extent has the "project" or "product" replaced the dissertation based presumably on research, particularly in the Ed.D. program?
4. What kinds of statistical techniques are being used in experimental and other studies in which inferential, rather than descriptive statistics, are appropriate? To what extent is use being made of the newer non-parametric techniques? Do the designs appear sound and are the statistical techniques generally appropriate to the design?
5. What can be said about the quality of the sampling made by students with different types of research problems, e.g., the appropriateness of the size of the sample, the way in which the subjects were selected, and the use of controls?
6. What are the various uses which are being made of the computer in process-

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*This chapter was written by Dr. Dorothy M. Knoell, Associate Research Psychologist, Center for the Study of Higher Education, University of California (Berkeley).

ing data for the dissertation? Is there any evidence that the quality of research involving use of the computer is higher than that of research on comparable topics where the analysis is made "by hand," using desk calculators?

7. What are the major problem areas, if any, in which there is some concentration of dissertation research in the various fields in which the degree was awarded? To what extent is there overlap among the fields in the kinds of problems selected for investigation?
8. Can promising new lines of investigation, measuring techniques, research concepts, and other developments be identified from the abstracts?

Plan of the Analysis

The fields of specialization of the respondents were grouped as follows for most analyses:

1. Administration
2. Curriculum;
3. Special methods, e.g., science education and reading;
4. Educational psychology, including special education and human development;
5. Counseling and guidance;
6. Higher education, adult education, and teacher education;
7. Educational foundations, including history, philosophy, and sociology of education;
8. Elementary and secondary education with no particular subject-matter specialization.

The number of respondents in each group is given in Table by type of degree awarded. Approximately one-third of the students were awarded the Ph.D. degree, two-thirds the Ed.D. degree. Nearly 30 per cent of the degrees were awarded to students in administration, which is almost twice the number awarded in any other single field. The relative proportions of Ph.D. and Ed.D. degrees varied among the eight fields, with the largest proportion of Ed.D. degrees in administration and curriculum and the smallest in educational psychology.

TABLE 32

NUMBER OF RESPONDENTS WHOSE DISSERTATION RESEARCH WAS ANALYZED, BY FIELD AND TYPE OF DEGREE AWARDED

Field	Type of Degree Awarded				
	Ph.D.		Ed.D.		Total
	n	%	n	%	n
Administration	100	22	356	78	456
Special Methods	90	35	164	65	254
Educational Psychology	120	49	126	51	246
Curriculum	50	23	169	77	219
Counseling	85	41	123	59	208
Higher education	28	30	65	70	93
Foundations	30	41	43	59	73
Elementary and Secondary	13	27	36	73	49
Total	516	32	1082	68	1598

A classification scheme was developed for the analysis of the methodology which was based on the following general principles:*

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*See page 56 for additional explanation of categories.

1. Some dissertation problems involve quantitative data and statistical treatment; others do not.
2. Both inferential and descriptive statistics are used in some so-called quantitative dissertations, while only descriptive statistics are used in others.
3. Some dissertations in which inferential statistics are used may be classified as "experimental," in that the researcher actually does something to his subjects (or causes something to be done), while others may be viewed as merely investigative--of relationships, differences, effects (without adequate controls), and relations over time (prediction).
4. Other quantitative-type dissertations which often employ only descriptive statistics are the "counting" or "bookkeeping" studies. Some are normative surveys but others may be called status studies in that an attempt is made to describe and analyze "what is," beyond mere counting.
5. Non-quantitative dissertations may be viewed as evaluative (e.g., curriculum content, techniques of instruction), analytical (e.g., trends, relationships which are not quantified), historical, legal, and theoretical.
6. Still other dissertation research results in either a non-statistical product such as a curriculum or a unit of study, or a test or other measuring device involving item analysis, reliability, and validity techniques.

Analysis of Methodology

Eight major types of research methodology constituted the classification scheme used in the analysis of the dissertations. Sub-categories were developed for four of the eight types, which resulted in a total of 14 different methodologies:

1. Experimental (involving both controls and treatments)
    a. Laboratory (contrived situation, non-curricular content or material)
    b. Field (classroom or other natural learning situation with meaningful content or material)
2. Investigative (relationships involving inferential statistics but the researcher is not involved in treatments)
    a. Prediction (independent and dependent variables)
    b. Concomitant relationships
    c. Differences (between and among samples or sub-samples)
    d. Effects (changes or differences after some event or program, without controls or researcher-produced treatment)
3. Surveys
    a. Normative (counting how many "are," "do," or "believe" something, using large (gross samples)
    b. Status (refined normative survey with more careful sampling and some kind of assessment of what the situation or condition is)
4. Evaluative (concerned with curricular content, techniques, or factors in non-quantitative relationships, e.g., counselors' ideas about factors affecting high school dropouts)
5. Analytical (concerned with trends, roles, relationships, and other non-quantitative factors which do not involve assessment or evaluation)
6. Developmental (objective of the research is the development of some type of product other than knowledge)
    a. A new measuring instrument or technique, validation of an existing technique, or a new application of a technique;
    b. A non-psychometric product, e.g., a new course of study, set of guidelines, or criteria
7. Historical (including legal, because of the small number of dissertations which fitted the latter category)
8. Theoretical (no data, in the usual sense, but a logical approach to a problem at a highly abstract level).

The research methodology used in the doctoral dissertations by students receiving degrees in the various fields is summarized in Table 33-A by type of degree granted. A further summary is shown in Table 34 in which the percentages of experimental,

TABLE 33 PART A

RESEARCH METHODOLOGY USED IN DOCTORAL DISSERTATIONS, BY TYPE OF DEGREE AND FIELD IN WHICH DEGREE WAS AWARDED

Field	Type of Degree	Experimental		Investigative				Survey
		Laboratory	Field	Prediction	Relationships	Differences	Effects	Normative
Administration	PhD	0	5	1	23	13	3	11
	EdD	0	18	5	42	52	14	53
	Total	0	23	6	65	65	17	64
Special Methods	PhD	0	17	3	10	16	8	5
	EdD	3	22	3	11	16	11	17
	Total	3	39	6	21	32	19	22
Educational Psychology	PhD	15	9	9	24	27	12	2
	EdD	11	17	7	34	26	6	2
	Total	26	26	16	58	53	18	4
Curriculum	PhD	3	7	1	9	6	3	3
	EdD	0	33	1	15	21	19	15
	Total	3	40	2	24	27	22	18
Counseling	PhD	1	8	6	26	19	10	6
	EdD	2	16	12	21	24	4	8
	Total	3	24	18	47	43	14	14
Higher Education	PhD	1	1	0	4	8	1	5
	EdD	1	7	2	5	16	3	8
	Total	2	8	2	9	24	4	13
Foundations	PhD	0	0	0	1	3	1	0
	EdD	0	1	0	3	6	1	3
	Total	0	1	0	4	9	2	3
Elementary and Secondary	PhD	2	1	0	2	2	1	0
	EdD	1	5	1	4	4	5	4
	Total	3	6	1	6	6	6	4
Total	PhD	22	48	20	99	94	39	32
	EdD	18	119	31	135	165	63	110
	Total	40	167	51	234	259	102	142

investigative, survey, and non-quantitative dissertations are given by field and type of degree. Of the nearly 1600 dissertations which were analyzed, 54 per cent were either experimental or investigative and used inferential statistical techniques which appeared to be appropriate to the design of the study. About one-third were essentially non-quantitative in nature or made use of only simple, descriptive statistical techniques, and 12 per cent involved some type of survey technique. Only 13 per cent of the dissertation studies were experimental in nature, i.e., involved some type of treatment by the researcher, in either a laboratory or a classroom or other natural situation, with appropriate controls and sampling procedures. One in five experimental studies was conducted in a laboratory or "contrived" situation, primarily by students in educational psychology. A large majority of the experimental studies involved the use of intact classes, regular teachers, and content normally found in the curriculum. An additional 102 studies (6 per cent of the total) were categorized

TABLE 33 PART B

RESEARCH METHODOLOGY USED IN DOCTORAL DISSERTATIONS, BY TYPE OF DEGREE AND FIELD IN WHICH DEGREE WAS AWARDED

Field	Type of Degree	Survey	Evaluative	Analytical	Developmental		Historical	Theoretical	Total
		Status			Psychometric	Product			
Administration	PhD	3	9	20	2	3	6	1	100
	EdD	16	43	60	5	28	19	1	356
	Total	19	52	80	7	31	25	2	456
Special Methods	PhD	7	4	6	2	4	7	1	90
	EdD	12	22	17	2	20	7	1	164
	Total	19	26	23	4	24	14	2	254
Educational Psychology	PhD	0	3	4	12	0	1	2	120
	EdD	2	3	2	7	6	3	0	126
	Total	2	6	6	19	6	4	2	246
Curriculum	PhD	1	4	6	3	0	2	2	50
	EdD	6	14	16	2	20	6	1	169
	Total	7	18	22	5	20	8	3	219
Counseling	PhD	2	2	0	5	0	0	0	85
	EdD	3	11	11	3	6	1	1	123
	Total	5	13	11	8	6	1	1	208
Higher Education	PhD	0	4	3	0	1	0	0	28
	EdD	2	8	4	0	1	7	1	65
	Total	2	12	7	0	2	7	1	93
Foundations	PhD	0	1	10	0	0	10	4	30
	EdD	0	4	15	0	2	6	2	43
	Total	0	5	25	0	2	16	6	73
Elementary and Secondary	PhD	0	2	1	0	1	1	0	13
	EdD	1	3	1	3	2	2	0	36
	Total	1	5	2	3	3	3	0	49
Total	PhD	13	29	50	24	9	27	10	516
	EdD	42	108	126	22	85	51	7	1082
	Total	55	137	176	46	94	78	17	1598

as investigative of "effects" in that the researcher attempted to study the results of some special instructional technique, program, or condition, without using the customary control groups or obtaining pre-test data.

About 30 per cent of the dissertation studies involved investigations of either concomitant relationships (primarily correlation studies) or group differences (analysis of variance studies). The designs varied widely in their complexity although the influence of the computer was quite evident in the very large number of variables included in many of the correlation studies. There was also a vast range in the size of the samples used in both types of investigations, with availability of subjects more often the determining factor in size than the design of the study or the nature of the data to be collected. An attempt was made to distinguish between

TABLE 34

SUMMARY OF RESEARCH METHODOLOGY USED IN DOCTORAL DISSERTATIONS, BY TYPE OF DEGREE AND FIELD IN WHICH DEGREE WAS AWARDED

Field	Type of Degree	N	Quantitative				All Other Types
			Experimental	Investigative	Total	Survey	
Administration	PhD	100	5%	40%	45%	14%	41%
	EdD	356	5	32	37	19	44
	Total	456	5	34	39	18	43
Special Methods	PhD	90	19	41	60	13	27
	EdD	164	15	25	40	18	42
	Total	254	16	31	47	16	37
Educational Psychology	PhD	120	20	60	80	2	18
	EdD	126	22	58	80	3	17
	Total	246	21	59	80	3	17
Curriculum	PhD	50	20	38	58	8	34
	EdD	169	20	33	53	12	35
	Total	219	20	34	54	11	35
Counseling	PhD	85	10	72	82	9	8
	EdD	123	14	50	64	9	27
	Total	208	13	59	72	9	19
Higher Education	PhD	28	7	47	54	18	28
	EdD	65	12	40	52	15	32
	Total	93	11	42	53	16	31
Foundations	Total	73	1	21	22	4	74
Elementary and Secondary	Total	49	18	39	57	10	33
Total	PhD	516	14	49	62	9	29
	EdD	1082	12	37	49	14	37
	Total	1598	13	41	54	12	34

bookkeeping-type studies with an apparent gratuitous use of chi-square and other statistical techniques, and investigative studies which developed from reasonable hypotheses concerning group differences or other relationships. The former were included in the "survey" categories if no substantive hypotheses or questions could be inferred from the information submitted. The number of routine counting studies greatly exceeded the so-called status surveys which employed a more elaborate design for data collection and analysis. However, the two types of surveys together constituted only 12 per cent of the total number of dissertations analyzed, or fewer than 200 studies.

Approximately 20 per cent of the dissertation studies were classified as "evaluative" or "analytical," with the larger number falling in the second category. In part, they might be characterized either by the absence of quantitative data (from psychological measurements or the counting of objects or events) or by the use of only simple, descriptive statistics such as means, standard deviations, and percentages. It seems probable that the "design" of these types of studies involved questions to which descriptive, narrative answers were sought in the course of the "research," rather than null or other statistical hypotheses. A large percentage of these studies could have been cast in experimental or investigative terms but it was quite clear from the material supplied by the respondents that the statistical treatment was inconsequential or absent entirely. No distinction could be made between studies in which apparently valid, non-statistical research designs were employed, and those which were in effect discursive writing on a general topic. The line separating research from mere writing was almost invisible in large numbers of dissertations in several fields in which students received their degrees, most notably in curriculum and methods.

Nearly 10 per cent of the students undertook dissertation research which resulted in some type of product, rather than the usual "contribution to knowledge," per se. Students who received their degrees from Harvard University labeled their studies very clearly as "projects," not dissertations. However, the Harvard projects constituted only a small percentage of the 140 "dissertations" which were so classified. The traditional item analysis, reliability, and validity techniques were used in the so-called psychometric projects. In some instances the researcher developed an instrument to measure a particular concept or trait--in effect, hypothesizing that it could be measured reliably and validly, and then using the scores obtained by the instrument in some investigation. Others simply developed a test, tried it out, and, in a sense, prepared a manual for its use, e.g., "The Construction of an Achievement Test to Measure Small Engine Instruction." The research which accompanied the development of other types of products was somewhat less apparent. Some products were based on reviews of the literature, others on normative surveys, and still others on observations and experience in a particular job. Like the producers of the survey studies who contrived chi-square tests to lend respectability to their research, the students whose dissertations were in effect products often resorted to the use of panels or judges or experts as a source of quantitative data to which statistical tests of agreement and reliability could be applied.*

About five per cent of the dissertations were historical in nature, including a few which employed legal research techniques. Most of the students purported to use the historical method of research. However, fully half the studies appeared to be no more than narrative accounts of the history of X College, Y Association, or Z Program, based on library research and interviews. In other dissertations based on historical research an attempt was made to trace the development of movements, ideas, policies, and other forces over time, rather than to chronicle events in the life of an institution. As was true of the curriculum area, the distinction between research and mere writing was a difficult one to make.

Only 17 dissertations were classified as theoretical although a number of the studies in the "analytical" category might have been "upgraded" to the theoretical category if more information had been available on which to base a decision. The theoretical designation was reserved for those dissertations which appeared to represent creative contributions to knowledge at a fairly high level of abstraction. Quality could not, of course, be assessed from the brief description of the dissertations which were provided by the respondents.

Analysis by Type of Degree Granted

The Ed.D. degree was awarded to 68 per cent of the students whose dissertations were analyzed, the Ph.D. degree to 32 per cent. Some differences could be noted between the two types of students in the research methodologies they employed, which was not totally independent of the fields in which the degree was granted. As might be expected, the percentage of Ph.D. recipients who conducted experimental or investigative studies was higher than the percentage of Ed.D. recipients using similar methodologies--62 per cent of the former, 49 per cent of the latter. The difference occurred primarily in the investigative, rather than the experimental category. However, a slightly higher percentage of the Ed.D. than Ph.D. recipients conducted survey-type studies (14 and 9 per cent, respectively), with the result that the percentages of non-quantitative studies were quite similar for the two groups (29 per cent of the Ph.D.'s, 37 per cent of the Ed.D.'s).

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*Many of the products may in fact make a greater contribution to educational practice than "knowledge" studies which are poorly conceived and executed but it may be questionable whether they should continue to be labeled "research" in the usual sense of the term.

A comparison of the non-quantitative dissertations produced by the two groups of degree recipients showed that the Ed.D. students tended to make evaluative studies and to develop some type of product, while the Ph.D. students had a greater tendency to construct a measuring instrument. The Ed.D. students also tended to avoid laboratory-type experimental research although they carried out their fair share of field experimentation.

Analysis by Field in Which the Degree Was Granted

Major differences may be observed in Tables 33-A and 34 in the frequency with which the various research methodologies were used by students who earned their degrees in different fields of education. As might be anticipated, the percentages of students in educational psychology and counseling who undertook experimental or investigative thesis research were very high (80 and 72 per cent, respectively), and the percentages in administration and the foundations area who used such methodology relatively low (39 and 22 per cent, respectively). Differences among fields may be pointed up by a brief characterization of the methodologies used by students who received degrees in each of the various fields.

Administration. The percentage of students who used non-quantitative methods in their thesis research was slightly larger than the percentage who conducted experimental-investigative studies (43 and 39 per cent, respectively). Eighteen per cent undertook survey studies, primarily of the normative type. Few students attempted experimental or investigative studies of the effects of particular programs or techniques. The category into which the largest number of dissertations in administration fell was "analytical." Differences between the Ph.D. and Ed.D. dissertations with respect to methodology were relatively small.

Educational Psychology. Differences in methodology used by the two types of degree recipients in educational psychology were small, despite the concentration of students in special education in the Ed.D. program whose interests were quite different from those of the general educational psychology group. As has been noted, 80 per cent of the research fell in the experimental and investigative categories--21 per cent in the former and 59 per cent in the latter. The investigative categories with the highest frequencies were studies of relationships and differences. Dissertations involving these two types of methodology were twice as numerous as those using laboratory of field experimentation. Non-quantitative dissertations constituted less than 10 per cent of the total in this field.

Counseling. Dissertation research performed by students in counseling was also characterized by a relatively large proportion of experimental and investigative studies (72 per cent, compared with 54 per cent for the total group). Differences in methodology between the Ph.D. and Ed.D. groups were great, particularly in the investigative and non-quantitative categories. Only half the Ed.D. students conducted investigative types of studies, compared with nearly three-fourths of the Ph.D. students. On the other hand, the number of Ed.D. students who undertook non-quantitative research studies was more than three times greater than the number of Ph.D. studies in these categories. Although no formal analysis was made of the characteristics of the two groups, a cursory examination of the positions they held after receiving their doctoral degrees indicated that a high percentage of the Ph.D. recipients held college and university faculty appointments while the Ed.D. recipients were employed in various types of positions in both public schools and post-secondary institutions.

Curriculum. The spread of dissertation research of the curriculum students among the various methodologies was very similar to the spread for the entire group. Differences between the Ph.D. and Ed.D. groups were small. One notable difference between the curriculum and the total groups, however, was the comparatively large percentage of experimental studies conducted by the former, with a concomitant reduction in the investigative studies. Students who earned their degrees in curriculum but who did thesis research in special methods fields, e.g., physical education and reading, accounted for a majority of the experimental studies in curriculum. The particular methodology used by the largest number of students in curriculum was, in fact, the experimental type of study carried out in the classroom or other natural setting. The curriculum group was also notable for the comparatively large number of products it developed as dissertations, all of them by Ed.D. recipients.

While differences between the Ph.D. and Ed.D. groups were quite small, differences between groups doing thesis research related to particular subject fields and those undertaking more general thesis research were quite marked. More than one-fourth of the former group conducted experimental studies while the research of the latter group clustered in the analytical, investigative (relationships and differences), and product categories. Curriculum research thus appears to have been much more heterogeneous with methodology than the dissertation research in the other fields which have been examined.

Special Methods. The second largest group of dissertations which were analyzed were done by students with degrees in special methods, 32 per cent of whom received the Ph.D. and 68 per cent the Ed.D. degree. The largest numbers of degrees were awarded to students in physical education, science education, vocational-industrial education, music education, and language arts. While the percentage of "research" dissertations fell slightly below the 54 per cent obtained for the total group, the proportion of experimental studies was rather high, namely, 16 per cent. There were rather marked differences between the Ph.D. and Ed.D. groups with respect to several research categories. Only 40 per cent of the Ed.D. students undertook experimental or investigative research, compared with 60 per cent of the Ph.D. group, with the major differences in the investigative active category. The categories in which the largest percentages of Ed.D. dissertations fell are the evaluative and analytical methods and the product.

The Ph.D. thus tended to be a research degree for the students in the special methods fields and the Ed.D. a kind of project degree, except for the students in the physical education field who tended to undertake experimental or investigative research in both degree programs. Among the various special methods groups, students in vocational-industrial education, business education, and music education best fit the characterization of the Ed.D. as a non-research degree. Except in physical education, as noted, there was a greater balance in the other special fields between the Ph.D. and Ed.D. groups and more spread among the various methodologies.

Higher Education. The research of students whose degrees were granted in the field of higher education was distributed among the various methodologies in about the same proportions as were found for the total group, i.e., slightly more than half in the experimental and investigative categories and about one-third in the non-quantitative categories. Differences between the Ph.D. and Ed.D. groups were rather slight although the proportion of experimental research done by Ed.D. students was (unexpectedly) higher than the proportion done by Ph.D. students. However, since only 93 degrees were granted in higher education as a major field of concentration, numbers of dissertations in the various categories were small. About one-fourth of the dissertations of the students in higher education investigated problems of differences, usually between and among various student groups in higher education.

Almost as many dissertations in higher education were done by students who earned their degrees in the field of administration as were done by students receiving their degrees in higher education. However, the former were analyzed with the administration group. The administration-higher education students differed rather markedly from the general higher education group. Only one-third of the former were experimental or investigative in method and more than 40 per cent were non-quantitative. More than one-fourth of the Ed.D. studies in higher education administration were surveys. Reasons for the differences in types of studies made and choices of field in which the degree was earned are not at all clear. It is possible that they are related to the types of jobs held by the various degree recipients but this factor was not examined in the present analysis.

Educational Foundations. The foundations group was comparatively small and selected research methodologies about as one might expect. Nearly three-fourths of the group undertook non-quantitative thesis research, most of it either analytical or historical. Ph.D. students tended to select historical or theoretical problems while Ed.D. students tended to take an analytical approach to their thesis research. Investigative studies were performed primarily (but not exclusively) by students who received their degrees in educational sociology.

Elementary and Secondary Education. A small group of 49 students received their degrees in elementary or secondary education. One-third undertook non-quantitative research studies while 57 per cent made experimental or investigative-type studies, nearly one-third of them were experimental in nature. The number of Ph.D. degrees awarded to this group was too small to warrant comparisons based on type of degree. However, a comparison of the dissertation methodology employed by students in elementary and secondary education showed that the former were much more likely than the latter to undertake the various types of investigative studies. Few survey studies were done by these students but the secondary education group showed a greater preference for evaluative and "product" studies than did the elementary education students.

Summary of Methodology Analysis

A characterization of the near-total production of doctoral dissertations in education in 1964 would show that relatively few were experimental in the strict sense of the term, about the same number used normative survey techniques, about one-third were generally non-quantitative and non-statistical, and the remainder (somewhat less than half) were investigative in the sense that inferential statistics were used. Using a somewhat strict definition of research, one might conclude that a rather large proportion of the current doctoral dissertations are not really research studies. Differences in the type of research methodology employed by Ph.D. and Ed.D. candidates were not large for the total 1964 group. However, there were differences within and between groups which earned their degrees in the various fields of education. Differences in methodology related to type of degree earned were marked for the special education and counseling groups, with the Ed.D. the non-research degree in each case. Differences in methodology related to the field in which the degree was earned were quite marked for educational psychology and counseling (with a rather high percentage of "research" dissertations). Differences were also notable in the methodologies used by students in the various special methods fields.

Analysis of Statistical Techniques Used

A tabulation was made of the inferential statistical techniques used in the experimental and investigative studies. The frequencies for the main techniques are shown in Table 35-A, by type of study and field in which the degree was earned. A total of 853 dissertation abstracts were examined and their use of statistics tabulated in an attempt to describe and assess the current status of statistical methodology in doctoral research. The abstracts differed widely in the amount and accuracy of detail which the respondents provided. Therefore, it was not possible to give much attention to the factorial designs of the various studies. Responses to the question concerning techniques used varied from "several" or "simple" statistics, and "multivariate" or "factorial," to a specific textbook reference to the technique, together with a listing of codes for the computer programs used. However, most respondents listed in fairly straight-forward fashion the types of techniques or significance tests used.

TABLE 35 PART A

MAIN STATISTICAL TECHNIQUES USED IN DOCTORAL DISSERTATIONS, BY TYPE OF STUDY AND FIELD IN WHICH DEGREE WAS AWARDED

Field	Type of Study*	Statistical Technique Used						
		Chi-square	t-test	Analysis of variance	Analysis of covariance	Correlation (general)	Pearsonian correlation	Rank correlations
Administration	Exp.	1	9	8	4	1	1	1
	Inv.	58	29	33	6	17	16	13
	Total	59	38	41	10	18	17	14
Special Methods	Exp.	5	10	20	18	5	1	0
	Inv.	26	19	22	9	15	5	1
	Total	31	29	42	27	20	6	1
Educational Psychology	Exp.	5	11	28	15	9	1	3
	Inv.	36	40	51	7	28	18	5
	Total	41	51	79	22	37	19	8
Curriculum	Exp.	3	17	16	15	6	1	1
	Inv.	22	27	21	12	11	6	4
	Total	25	44	37	27	17	7	5
Counseling	Exp.	10	4	16	6	4	1	2
	Inv.	43	36	39	6	27	11	10
	Total	53	40	55	12	31	12	12
Higher Education	Total	20	9	13	2	5	2	1
Foundations	Total	5	4	5	0	2	0	2
Elementary and Secondary	Total	4	5	9	9	1	4	3
Total	Exp.	27	55	97	66	27	8	8
	Inv.	211	165	184	43	104	59	38
	Total	238	220	281	109	131	67	46

*Exp. - Experimental,
Inv. - Investigative.

TABLE 35 PART B

MAIN STATISTICAL TECHNIQUES USED IN DOCTORAL DISSERTATIONS, BY TYPE OF STUDY AND FIELD IN WHICH DEGREE WAS AWARDED

Field	Type of Study*	Statistical Technique Used					Number using two or more techniques	Number using computer	Total number of studies
		Other correlation techniques	Multiple correlation and regression	Factor analysis	Discriminant function	Non-parametrics (other)			
Administration	Exp.	2	1	0	0	5	10	9	23
	Inv.	8	23	10	3	18	73	106	153
	Total	10	34	10	3	23	83	115	176
Special Methods	Exp.	1	2	3	0	6	23	29	42
	Inv.	7	12	5	1	9	38	50	78
	Total	8	14	8	1	15	61	79	120
Educational Psychology	Exp.	0	0	1	0	9	46	18	52
	Inv.	10	16	15	9	15	39	93	145
	Total	10	16	16	9	24	85	111	197
Curriculum	Exp.	0	0	0	0	4	19	19	43
	Inv.	0	10	3	0	12	41	42	75
	Total	0	10	3	0	16	60	61	118
Counseling	Exp.	0	0	0	0	7	19	10	27
	Inv.	5	25	13	10	16	86	86	122
	Total	5	25	13	10	23	105	96	149
Higher Education	Total	2	4	3	3	4	21	32	49
Foundations	Total	0	1	1	0	2	8	2	16
Elementary and Secondary	Total	2	0	1	0	6	9	18	28
Total	Exp.	3	3	4	0	33	126	93	207
	Inv.	39	91	51	26	80	306	421	646
	Total	42	94	55	26	113	432	514	853

*Exp. - Experimental,
Inv. - Investigative.

About half the doctoral students used more than one type of inferential, including 61 per cent of the students who performed experimental studies and 48 per cent of those who conducted investigative-type studies. In tabulating the numbers of studies involving several techniques, zero-order correlations were not counted if the researcher used factor analysis, multiple correlation, and/or regression techniques. Similarly, it was assumed that appropriate t-tests would be made by users of analysis of variance techniques and the t-tests were not counted as a second technique. F-tests were not tabulated since the usage was very unclear in a large proportion of the responses. There was a rather high relationship between use of the computer and use of several different types of significance tests. The attitude of some students appeared to be one of using every computer program which was appropriate to some or all of the data, without regard to the objectives of the study or to the substantive nature of the hypotheses to be tested. Among the students making an apparently judicious use of computer time, two patterns of multiple usage of statistics stood out. First are the students who conducted experimental or other types of studies which lend themselves to an analysis of variance design, who also used various correlation techniques. The second group represents students who used chi-square technique to supplement other, more sophisticated tests of significance.

Use of the Computer

Sixty per cent of the total 1964 group made some use of a computer in analyzing their dissertation data. Greater use was made of the computer by students doing investigative-type studies (65 per cent) than experimental studies (45 per cent). Although a larger proportion of the latter involved the use of several statistical techniques, the researchers probably used the computer less because of the smaller samples involved in laboratory research and the lesser number of variables involved in both classroom and laboratory research.

There was no apparent relationship between need and computer usage, unless one wishes to infer need from a poorly conceived design (or no design at all). The inference might also be made from the data that a sizeable number of students never really came to grips with the statistical demands of their dissertation problem and, instead, turned the whole matter of analysis over to a computer programmer. At the other extreme, many students used a computer only to check their calculations or to handle a certain portion of the analysis of data. Many frustrations were reported in responses to the question about computer usage by students who tried and failed to secure the kind of computer output which would facilitate their analysis. Communication between doctoral students and personnel in a number of university computer centers was obviously rather poor. Students who turned their analysis of data over to computer personnel appeared to be more satisfied with the output than students who attempted to do their own programming or to work with staff in computer centers. However, many students in the former group appeared to have poorer insight into their data and its statistical treatment than the do-it-yourself group.

Use of the computer appeared to lead to some poor doctoral research which would not have been done if a computer had not been available. The indiscriminate use of statistical techniques is one such abuse which has been mentioned, including the computation of many hundreds of chi-square values in some studies. Examples of studies were also found in which very large matrices of intercorrelations were generated and factor analyzed by computers, using data collected for very small groups of subjects ($N < 100$). Very often the types of scores or indices used in such studies might be expected to have low reliability and large standard errors of measurement which would reduce the likelihood of common variance to be factor analyzed.

Incidence of Various Statistical Treatments

An examination of the cell entries in Table 35-B shows that the total incidence of correlation studies was rather high in the more than 500 dissertations which were examined in the analysis of statistics. One or more types of linear correlations were computed in 85 per cent of the studies. Multiple correlation and/or factor analysis techniques were used in 29 per cent of the studies, nearly all of them investigative. Many of the studies involved several types of correlations.

One-third of the doctoral students used analysis of variance designs of differing complexity, including nearly one-half of those who performed experimental studies and about 28 per cent of those who made investigative studies. Covariance studies constituted only 13 per cent of the total, including 31 per cent of the experimental and 7 per cent of the investigative. One might infer from the sampling procedures and controls used that a much larger proportion of the studies should have used covariance, rather than simple analysis of variance techniques. Neither the so-called random sampling which was made nor the t-tests of pre-treatment differences gave much assurance that covariance treatment was unnecessary.

Chi-square tests were made in 28 per cent of the dissertation studies, including one-third of the investigative and 16 per cent of the experimental studies. In the latter cases, chi-square was obviously used to test minor hypotheses or to check agreement among judges or raters. In the areas of administration and higher education chi-square was used more frequently than any other single technique and was often the only technique used in analyzing the data. This was found to be true in certain studies of roles, perceptions, concepts, and performance, where simple differences were investigated. Comparatively little use was made of the newer non-parametric techniques, e.g., the Mann-Whitney U and Kruskal-Wallis tests. Such tests were used in only 13 per cent of the 1964 dissertations, including 16 per cent of the experimental and 12 per cent of the investigative studies. None of the tests were used in more than a dozen dissertations. In addition to the two already mentioned, there was some incidence of use of the Wilcoxon matched-pairs signed-ranks, the median, the sign, the Kolmogorov-Smirnov, and the Fisher exact probability tests. Seventeen students reported that they used non-parametric statistics without specifying the particular tests used. Two other relatively new tests which were used by a number of students are the Scheffe test and the Duncan multiple range test.

The most sophisticated use of statistics appears to have been made by students in educational psychology and counseling, in many different types of experimental and investigative studies. Their dissertation research involved good analysis of variance and covariance designs in their experimentation in teaching and learning, and also the appropriate use of factor analysis and discriminant function techniques in their many studies of student characteristics and performance. These same students were among the most frequent users of non-parametric techniques which were well suited to their data.

Statistical treatment in dissertations completed by students in curriculum was somewhat less sophisticated than that of students in the special methods and elementary-secondary fields. Many of the curriculum studies used only t-tests or simple analysis of variance designs while studies in the other fields involved much more complex variance and/or covariance designs. The least sophisticated treatment seems to have been given by students in higher education and in administration with an emphasis on higher education. This lack of complexity and/or sophistication does not imply a lack of quality or depth in the dissertation research but rather a less experimental approach to research problems in higher education. The characterization does not apply to students in higher education whose degrees were awarded in the field of counseling for these students tended to attack fairly complex problems of student behavior and performance at the college level.

While differences among the fields were rather apparent in the various analyses, variation within fields and, in a few cases, between the two types of doctoral programs in particular fields was also great. Furthermore, differences in statistical treatment and complexity reflected differences in research methodology, which also reflected differences in the basic substantive research interests of students in the various fields in which the degree was awarded. More critical considerations than sophistication and complexity appear to be ones of the quality of the sample chosen for study, the nature of the data collected, the appropriateness of the research methodology and statistical treatment to the problem and, most important of all, the significance of the problem to be investigated, regardless of field of study.

Quantitative Analysis in Other Types of Studies

A tabulation was made of the incidence of use of a computer and/or some statistical treatment of data in a sample of several hundred studies from the various fields of study classified as surveys, products, and evaluative and analytical research. Tests and other psychometric studies were omitted from the tabulation because of their obvious involvement with statistics. Historical-theoretical studies were omitted because of their equally obvious lack of statistical treatment. It was found that there was no statistical analysis in nearly two-thirds of the studies examined, of either an inferential or a descriptive nature. The special methods and higher education dissertations fit this designation more often than dissertations in educational psychology and counseling, when studies using comparable methodology were compared. Despite the lack of statistical treatment, a computer was used in processing material in nearly 10 per cent of these studies. In most instances, coded information was punched into IBM cards for sorting and counting by a computer or simple tabulating equipment.

Sampling in the Dissertation Research

The size and nature of the samples, per se, were not analyzed since the information thus obtained was judged to have little usefulness in an assessment of the research methodology. Both aspects of sampling need to be examined in relation to the hypotheses tested, the nature of the data, and other factors which were beyond the scope of the present study. However, certain shortcomings were very apparent in a sufficient number of dissertations to warrant some comment.

The most obvious defect in the sampling used in the studies examined is one of size--either an unsatisfactory return on mailed questionnaires or an inadequate sample for the statistical treatment given. Another problem of size arose from having to limit the sample to "available" subjects in situations in which the researcher must have access to his subjects. In some cases the sample was in effect the total population in a given setting, at a specified time. In others, the sample represented all subjects who could be recruited for a particular experiment. Apparently there was a failure to perform a feasibility test in many cases, to find out whether a sufficiently large pool of subjects existed from which to draw an adequate sample.

A more basic problem involved criteria for judging how large a sample (or samples) should be, in order to make a fair test of hypotheses involving certain types of data. Size was usually fixed in the many studies of intact classes in elementary and secondary schools, except in the few instances in which the researcher drew samples of individual students from classes to which some treatment had been given. In many experimental and investigative studies in which samples of individual subjects were drawn there was a kind of monotony in the frequency with which samples of 36 subjects were selected for study without reference to the characteristics of the data to be analyzed, e.g., reliability, validity, type of score or index yielded, and the expected variance in the samples used. Only one student reported having taken into account both test characteristics and the significance test he planned to use in determining the size of the samples he would need in order to secure a significant difference. A final sampling problem which was alluded to earlier is one of controls in experimental studies, particularly in the field--the use of control groups; matching, equating, and pairing devices; and random sampling with appropriate checks.

The citing of examples of what appears to be poor or inadequate sampling should not be interpreted as a general condemnation of techniques used by the 1964 doctoral candidates. Probably a majority of the dissertations in the experimental and investigative categories utilized appropriate design and sampling. At the same time, there was a very large group of apparently worthwhile studies which would have benefitted from more careful attention to sampling problems in relation to other aspects of the design.

Analysis of Content

Repeated attempts to develop meaningful categories in which to summarize the substantive nature of the doctoral dissertations were largely unproductive. These attempts included the use of field, level, nature of the data, nature of the problem studied, and area of educational practice, e.g., methods, finance, and student characteristics. Each of the various categories was found to be usable, in that the content of the dissertations could be so classified, but none appeared to point up the major concerns or foci of interests which the doctoral students in 1964 expressed in their thesis research. In still another analysis of content it was found that most students undertook dissertation studies which were related directly to their fields of specialization, i.e., administration students worked on problems of administration, curriculum students made curriculum studies. The exceptions were the special methods studies performed by a large group of curriculum students and the varied interests of the students in higher education. Counseling students also showed some tendency to select research problems in the areas of instruction and student characteristics, as well as the counseling process.

The categorization approach was thus abandoned and in its place a somewhat subjective summary was undertaken which embodied some of the emerging concerns of the doctoral students in their dissertations. In the instructional area, the two emerging concerns which were identified in the analysis are programmed instruction-learning and the "new" curricula in mathematics and science. Most of the studies of programmed instruction were experimental in nature. Some of them tested the effectiveness of particular programs (usually prepared by the researcher) in teaching a certain unit or course at a given grade level, while others were concerned with the actual techniques of constructing programs, e.g., different types of feedback modes with an analysis of covariance design. While some such studies appeared to do little to advance knowledge of teaching and learning, on the whole the dissertations in the area of auto or programmed instruction seemed to constitute a promising new area of investigation leading to further research at the post-doctoral level by the degree recipients.

Some research concerned with the new science and mathematics curricula was found to be experimental in nature but there were also evaluative studies and some "products" developed. In one such study the researcher constructed five new sets of apparatus, tested its performability and designed its experimental use in such a way that there could be statistical treatment of random errors in the several runs made,"...probable error with average deviations and the general technique of propogating errors to the final answer."

Interest in creativity extended across fields, grade levels, methodologies, and types of data analyzed. The current popularity of this area of investigation apparently led to some rather poor dissertation research by students who lacked talent for designing a proper study and attempted to compensate for this lack by including many different types of variables in the data collection. At the same time one of the promising aspects of research in this area is the communality of use of standardized measures of creativity, for example, the Minnesota Tests of Creative Thinking.

The 1964 dissertation research appeared to be noteworthy for the absence of perfunctory studies of academic achievement and school dropouts. Instead, rather promising new approaches to these two academic phenomena were found which involved the extensive use of non-intellective and sociometric measures which were related to various aspects of school achievement. Considerable attention was given to underachievers at various grade levels in an attempt to refine knowledge concerning under-, over-, and average achievers.

Communication was a focus of interest in many fields in which the dissertation research was analyzed--communication between teacher and pupil, counselor and client, teacher and principal (or supervisor or superintendent), superintendent and board, and school and community. Almost the full range of methodologies was employed in studying the various problems of communication, with some neglect of experimentation. Dissertation research on roles would probably constitute one of the largest "content" categories if a complete classification were made--role descriptions, perceptions, expectations, satisfactions, congruence, and theory. While most of the role studies involved school administrators, some also involved teachers, counselors, and pupils sometimes in relation to each other and in some cases in relation to administrators.

Still other areas of investigation which appeared to offer promise in the 1964 dissertation research are studies of organizational and classroom climate--descriptions, new techniques for measurement, effects on teachers and teaching; studies of process in curriculum--process of effecting institutional change, involvement of teachers in relation to satisfaction, cybernetics; and studies of the personality dynamics, values, perceptions, and other non-intellective traits of the various groups who populate the schools and colleges, in an attempt to gain further insights into the learning process beyond those resulting from the traditional cognitive studies.

Summary Assessment

Trends, directions, emphases are all difficult to infer from this one cross-sectional analysis of dissertation research. Quality is difficult to assess from the very brief descriptions of the research which were obtained. The poor studies usually were betrayed in very few words; the good research had to be inferred from the design. However, certain generalizations and/or predictions seem quite firm from the analysis of the nearly 1600 dissertation abstracts:

1. The electronic computer is having a very profound effect on both the nature and the quality of dissertation research. Many studies are being undertaken which would not have been possible before the age of the computer, some of which probably should not be undertaken under any circumstances. The computer remains a force in 1964 which has not yet been mastered by the student researchers.
2. The laboratory technician appears to have been replaced by the computer programmer, except insofar as social psychology has its own laboratory techniques. Few students designed and constructed equipment for use in their research; their skill was more often shown in the neatness of variance and covariance designs they chose for their studies.
3. The disciplines which appear to have the strongest attraction for the student researchers in 1964 are social psychology-sociology, on the one hand, and the subject-matter specialties on the other. The former group are process-oriented, the latter focus on content.
4. There is a vast gray area of dissertation activity which may not merit the designation of research. The methods are fuzzy, the hypotheses non-existing or meaningless as stated in the null form, and the statistics inappropriate. No clear models emerge from the analysis, which might be used to define and delimit the spectrum of appropriate dissertation designs. The "product" or "project" is clearly superseding the "contribution to knowledge" objective in many dissertation studies. Thus the umbrella called dissertation research in 1964 covered a great heterogeneity of activity.

CHAPTER V

A STUDY OF OUTSTANDING SCHOLARS AND THEIR TRAINING FOR RESEARCH*

Every academic discipline is currently confronted with the need to expand its pool of talent from which it may draw its future research scholars. Nowhere is the need for this expansion more imperative than in the field of education. The U. S. Office of Education estimates that in 1965 over 54.4 million, or 28 per cent of the population, were studying in our educational institutions. By committing itself to the task of providing educational opportunities for all of its citizens, the United States has placed in the responsibility of its educators a task which exceeds in nature and in scope the educational tasks of the other major nations of the world combined. Added to this is the fact that there are probably no local, national, or world problems (e.g. civil rights, equality of economic opportunity, world peace) that are not reducible to a question of education. The need for research scholars who can work toward the alleviation or solution of these problems is reaching the critical point.

A formidable array of investigators have made both quantitative and qualitative assessments of the status of educational research and researchers. Their consensus indicates that there is great need for improvement in the methods of identification, training and support of scholarship in this area. To belabor these findings, or to decry the dearth of scholarship in education by attacking Schools of Education, would probably be an exercise in futility. The vast majority of these institutions, like the vast majority of the professional schools of medecine, law and dentistry, make no pretense that they view their main role as the preparation of researchers. Their statements of objectives and their programs demonstrate that they consider their main function to be the training of practitioners. This is apparently as true for some of the major universities as it is for the so-called teacher training institutions. Witness the fact that many major graduate universities offer their doctoral students in education a choice between the professional (Ed.D.) degree and the research (Ph.D.) degree. Witness too, the large number of professional degrees compared to the small number of research degrees in education granted by institutions such as Harvard, California and Columbia Universities.

It would be inaccurate to suggest that there is a necessary imbalance in these ratios. The probability is that quantitatively the need for practitioners in the educational systems of the nation will always dominate the need for researchers. On the other hand, the nation which neglects the full development of its scholarly potential is in grave danger of reversing the thrust of its progress and, in the words of one of Auden's poems, "Running the risk of lecturing on navigation while the ship is going down".

Purpose of the Study

Currently, over 2400 doctoral degrees are awarded annually by graduate schools of education in the United States. It is to the education and development of these individuals that this study is addressed. It represents an attempt to gain insight into those factors which appear to influence (or to converge in) the development of research scholarship in educators and/or in scholars who work in fields related to education. The ultimate objective of the study was to suggest ways and means for strengthening the training of educational researchers. To this end, the instrumental objectives were: to study the background and training, the personal characteristics and the research productivity of outstanding scholars; to make an assessment of the resources, programs and personnel available in the institutions in which they were trained, and in which they are now working; and to describe the general climate and the specific conditions under which productive scholars work.

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Assumptions

On the assumption that a study of the background and training, the personal characteristics and the research activities of productive researchers would yield valuable insights into the making of a scholar, questionnaires and interview schedules, together with other sources of data were prepared and used to test the following assumptions:

a. Productive researchers are likely to be graduates of, and faculty members in research-oriented graduate schools.
b. Productive scholars tend to have been students of, or to have been associated with, other productive scholars during and after their graduate training.
c. Productivity in educational research is related to
    1. completion of graduate study at a relatively early age
    2. full-time commitment to graduate study, and
    3. academic background in the arts and sciences
d. Productivity in educational research is related to such institutional factors as:
    1. emphasis on productive scholarship for appointment and promotion
    2. greater emphasis on either basic or applied research, or both, than on professional field service in schools of education
    3. greater curricular emphasis on the philosophy and science of education than on professional training; and
    4. administrative emphasis on research scholarship, rather than on practical training and service to schools.

Procedure

Identification of the Sample of Scholars

A preliminary step in the investigation involved the identification of a sample of productive researchers who had contributed to studies in education. Because research conducted by behavioral scientists often involves the investigation of problems that are essentially educational, it was assumed that scholars from these fields could provide valuable insights on their training that might appropriately apply in the training of researchers in education.

Thus, the search for a sample of productive researchers included an investigation across the various specialties within education, and across the disciplines related to education.

Using a modified version of the methods developed by Clark in his study of America's Psychologists, a roster of researchers was compiled from the contributors in selected scholarly and professional journals. In order to secure a representative sample of journals which could supply such a roster, educational researchers at the University of California, Berkeley were asked to submit the names of scholarly publications which they frequently used and which they recommended to their doctoral students. These individuals represented the disciplines of educational administration, educational anthropology, educational psychology, educational sociology, educational economics and the fields of general curriculum and history. From the list of titles suggested, the following twelve journals were selected as representative of those publications which reported the major portion of educational research:

American Psychologist
Journal of Counseling Psychology
Journal of Educational Psychology
Journal of Educational and Psychological Measurement
Journal of Educational Research
Journal of Experimental Education

Journal of Educational Sociology
Journal of Sociological Psychology
Journal of Psychometrica
Harvard Educational Review
History of Education Quarterly
The School Review

The Roster of Researchers

A count was made of the first name authors of articles appearing in the selected journals over the period beginning January 1954 and ending, December, 1963. Articles which gave no evidence of data collection or analysis were omitted so as to avoid the inclusion of publications of a review or non-research nature. The names of the authors of 5,401 articles were punched on IBM cards, sorted alphabetically and ranked on the basis of the number of entries per researcher.

Some difficulty was met at this stage because of the varying manner in which names were sometimes signed. For example, due to the omission of a middle initial, or to the practice of using only an initial to signify a first name, it was sometimes practically impossible to determine whether one or another person was indicated. A decision had to be made to omit these cases from the list.

An obvious weakness in this method of selecting productive scholars lies in the fact that a large proportion of the research related to education is published in book, monograph or chapter form. All these sources could not be included in the search because the magnitude of the task involved in reviewing them would be prohibitive. However, it was assumed that although entries in research journals would not give an exhaustive list of productive individuals they would provide an adequate sampling for the purposes of this study. When a check was made on the bibliographies of those who were selected for the final sample it was found that the subjects had indeed published in all the various media.

A further weakness in the use of the selected journals was seen in the fact that the specialties within education proved to be disproportionately represented; some by omission, such as philosophy, and some by over-representation, such as psychology. In an effort to achieve balance, several general journals, notably, The Harvard Review of Education, the School Review and the Journal of Educational Research, were included but this did not completely resolve the problem. Many journals in education and related fields tend to devote a large part of their copy to reviews, speeches, essays and announcements. These had to be rejected for the purposes of this study because the criterion--evidence of data collection and analysis--could not be corroborated. It should be noted parenthetically, that the lack of a standardized indexing form presents an annoying obstacle to the researcher who wishes to read across several fields. The problems mentioned by Clark in this regard were confirmed by this investigator. An unconscionable amount of time can be spent in studies of this kind for want of systematic or standardized indexing and abstracting service. The availability of an abstract service which systematically reported research across the related disciplines would greatly facilitate interdisciplinary research on education. This is probably a function which the various scholarly societies and the U. S. Office of Education could admirably render to those who are interested in educational research from the perspective of several disciplines.

Identification of Productive Researchers

From the author list of 5,401 journal articles which appeared to fit the criterion, a list of the names of 94 high producers was drawn. Essentially, this represented a quantitative measure of those who had published five or more research articles in the selected journals over the years 1954-1963 inclusive.* The range in the number of journal entries for the 94 selectees was from three to twenty-four for the ten year period.

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*In two cases, the researchers had published three reports, but their names were included so as to insure representation for their specialties.

The prepared list was then sent to all persons whose names appeared on it with the instruction that the recipient was to vote for the five researchers who, in his judgment, would be rated among the best in his specialty. The recipient was also urged to write in the missing names of any researchers whom he would include on a list of the best scholars in his specialty.

In an effort to insure that the raters might bring a high level of discernment to bear on their selection, each one was asked to specify his field of research. Each person on the list was then ranked on the basis of the number of ballots he received as "among the best in my specialty" from voters within his self-designated field.

Of the 94 persons who were asked to assist in the identification of the outstanding researchers in their fields, 87, or 92.5 per cent, cast their ballots. Efforts to secure adequate addresses for two of the persons on the list were unfruitful; one person on the list had recently died; one was out of the country and could not be reached in time to have his vote considered; another wrote to express his inability to make a choice and two persons did not acknowledge the request. When a tally was made of all the votes cast (including the write-ins), a new list was drawn which included those persons who received the highest number of nominations as among the five best researchers in his field.

Of the 60 write-in candidates who were rated by the voters as "among the five best in my specialty", 53, or 88 per cent, were nominated by only one person. Five persons received four or more write-in ballots. Three names were eliminated from this group because they are Center Staff members. The remaining two were added to the list of outstanding researchers.

A final sample was drawn to include representation from each of the specialties shown in Table 36.

TABLE 36

DISTRIBUTION OF SPECIALTIES ON THE JOURNAL ROSTER AND NUMBER OF NOMINEES FROM EACH SPECIALTY (SELF-DESIGNATIONS)

	Researchers on Journal Roster	Nominees Among Best in Specialty
	N=87*	N=31
Child Development	2	1
Clinical Psychology	6	0
Cognitive Processes	6	2
Counseling Psychology	8	3
Curriculum	3	1
Educational Measurement	8	3
Educational Psychology	5	1
General Psychology	1	1
Higher Education	6	2
History	2	2
Organization and Administration	6	2
Psychology of Personality	3	1
Psychometrics	6	2
School Learning	1	1
Sociology	6	2
Sociology of Education	3	2
Social Psychology	8	2
Test Development	7	3

*Omits the non-respondents

The Instruments

The Omnibus Personality Inventory

Studies by McKinnon, Drevdahl, Cattell, Guilford, Getzels, Heist, Sanford, Roe, and others indicate that in addition to high intelligence scores scholarly and creative persons tend to show distinctive personality characteristics.

In an effort to discover whether a profile of certain characteristics of eminent educational researchers may be drawn, the scholars in this study were asked to take the Omnibus Personality Inventory, an instrument which was developed at the Center for the Study of Higher Education, Berkeley. High scores on the scales measuring theoretical orientation, thinking introversion, ability to deal with complex ideas and interest in the aesthetic may be indicative of potential creativity.

The Questionnaire

Through a questionnaire prepared at the Center, data were collected on the educational backgrounds of the nominees. These included descriptive information on their graduate programs and on the research facilities and atmosphere in the institutions in which they studied. In addition, the respondents were asked to assess the strengths and weaknesses in their doctoral studies and to evaluate the adequacy of their formal research preparation. Items which evoked information on certain personal characteristics, such as age at the time of their initial involvement in research, sources of graduate support and factors or persons influential in the development of their research interests were also included. A copy of the questionnaire is shown on page   of the Appendix.

The Interview Schedule

An interview schedule consisting of open-ended questions was prepared to elicit supplementary data on the scholar's career development, professional experiences, and judgments about research training.

The interviews were held in the subject's office or home. They ranged in length of time between one-and-a-quarter hours to three-and-a-half hours. Interviews were recorded on tape but notes were also taken. A copy of the interview schedule is shown on page   of the Appendix.

Additional Sources of Data

Each subject was asked to submit a copy of his bibliography which was analyzed for number and types of publication. Entries in the bibliographies which purported to report research were tabulated and classified on the basis of their media of publication and type of authorship.

In addition to the instruments noted, data were also compiled from Who's Who in America, American Men of Science, Who's Who in Education, Directory of the Behavioral Scientists and Directory of American Psychologists.

Early in May a letter was sent to each of the 38 persons who had been identified as an outstanding scholar notifying him of his nomination and requesting his cooperation in the study. The questionnaire was enclosed with the letter together with a request for an interview.

With the exception of one person, who did not acknowledge the request, all nominees agreed to participate and each of these returned his questionnaire data.

Unfortunately, six of the nominees were out of the country or not at home when the interviewer was in their region; thus analysis was made on the basis of complete data from 31 of the 38 nominees.

The sample consisted of three women scholars and twenty-seyen males. Table 36 shows the distribution of the specialties represented on the journal list of productive researchers and the number of nominees in the sample from each specialty.

Academic Background of the Subjects

Degree Programs

Six of the scholars earned their undergraduate degrees in science and 25 earned arts degrees. At the masters level, 3 earned science and 20 earned arts degrees. One scholar received the Ed.D. degree, the remainder received the Ph.D. degree.

Fields of Study

Table 37 indicates that the 31 scholars represented 20 undergraduate, 5 master's and 8 doctoral fields of study. It also shows a convergence in fields of study as they progressed from one degree level to another. Only 8 of the subjects pursued advanced degrees in their undergraduate majors. Among the remainder, 18 earned degrees in two different fields and 6 earned degrees in three different fields. A third of the group took post-doctoral work. The nature of the latter generally reflected an extension of their doctoral specialties although several used this opportunity to enter new fields or to learn new skills.

TABLE 37

FIELDS OF STUDY PURSUED BY THE SCHOLARS: BY DEGREE LEVELS

	Bachelors	Masters	Doctoral	Post Doctoral
	N = 31	N = 23	N = 31	N = 11
American Studies	1	-	-	-
Biology and Philosophy	1	-	-	-
Business Education	1	-	-	-
Chemistry	1	1	-	-
Classics	1	-	-	-
Education	1	9	7	4
Engineering	2	-	-	-
English	4	-	-	-
French	1	-	-	-
History	4	1	2	1
Mathematics	3	-	1	-
Music	1	-	-	-
Physics	-	-	-	1
Physical Chemistry	-	-	1	-
Political Science	1	-	1	-
Psychology	7	10	16	4
Science	1	-	-	-
Social Relations	-	2	1	-
Sociology	1	-	2	-
Statistics	-	-	-	1

Although the majority of the subjects earned their doctorates in either psychology or education, the dispersion of their interests within these two fields was very broad. For example, among the Ph.D.'s in psychology were persons whose studies had emphasized general, clinical, counseling, comparative, experimental, educational, or social psychology as well as individuals who had specialized in animal behavior, psychometrics or the psychology of language. Among the Ph.D.'s in education were specialists in curriculum, testing, organization and administration, evaluation, measurement and teaching.

The breadth of interest and the movement of scholars into related fields, as indicated by these data, demonstrates both the range of researchable areas in education and the great potential for cooperative research among disciplines.

The fact that 93 per cent of the subjects had earned undergraduate degrees and 77 per cent earned master's degrees in letters and science verifies the assumption that outstanding educational researchers will tend to show a background in a substantive rather than a professional field.

Table 38 shows the formal progression in the educational baselines of the 31 scholars and the specialty in which, according to their self-designations, they currently pursue their research interests. These data suggest that educational problems have roots in many disciplines and that a more fruitful attack can be made on them by researchers who perceive them in relational matrixes rather than in the isolated context of one discipline.

TABLE 38

FIELDS OF STUDY AND RESEARCH SPECIALIZATIONS OF THE SUBJECTS

Field of Study			Research Specialty
Bachelors	Masters	Doctoral	(self-designation)
American Studies	History	History	History
Biology & Philosophy	---	Sociology & Economics	Sociology
Business Education	Psychology	Education	Educational Testing
Chemistry & Mathematics	Education	Education	Educational Psychology
Chemistry	---	Physical Chemistry	Social Psych. of Education
Classics	---	Psychology	Psychology of Languages
Education	Psychology	Psychology	Occupational Psychology
Engineering	Education	Education	Evaluation & Measurement
Engineering	---	Mathematics	Psychometrics
English	Psychology	Psychology	Higher Education
English	Psychology	Psychology	Counseling
English	Psychology	Psychology	Conditioning & Learning
English	Social Relations	Social Relations	Social Psych. of Education
French & Mathematics	Psychology	Psychology	Test Development
History	Social Sciences	Education	Curriculum
History	Psychology	Psychology	Counseling
History & Sociology	Education	History	Intellectual History
Mathematics	Religious Educ.	Education	School Learning
Mathematics	Psychology	Psychology	Psychometrics
Music	Psychology	Psychology	Higher Education
Political Science	---	Political Science	Administrative Behavior
Psychology	Education	Education	Educational Administration
Psychology	Education	Psychology	Child Development
Psychology	Psychology	Psychology	Higher Education
Psychology	---	Psychology	Psychology
Psychology	Psychology	Psychology	Measurement
Psychology	Psychology	Psychology	Attitude Measurement
Psychology	Psychology	Psychology	Predictive Testing
Science	---	Psychology	Personality Theory
Sociology	---	Sociology	Sociology
Sociology	Education	Psychology	Psychometrics

Institutional Background

Measured in terms of the number of their graduates on the list of productive researchers, six universities appeared to be carrying the burden of educational research training. In rank order, Columbia, Harvard, Chicago, Minnesota, California and Ohio State Universities awarded 55 per cent of the doctoral degrees and 51 per cent of the masters degrees earned by the productive researchers on the journal list.

When the institutional data on the 31 outstanding scholars were reviewed, it was noted that these same universities awarded 71 per cent of the doctoral degrees and 52 per cent of the masters degrees earned by this group. Much greater institutional dispersion was apparent at the undergraduate level. Here the 31 scholars earned baccalaureate degrees in 28 different institutions.

TABLE 39

DOCTORAL DEGREE INSTITUTIONS OF PRODUCTIVE RESEARCHERS

Institution N=31	Total Journal Roster N=93*	Top Researchers N=31
Columbia University	14	5
Harvard University	11	3
University of Chicago	9	5
University of Minnesota	9	5
University of California**	6	2
Ohio State University	6	1
University of So. California	4	--
University of Michigan	4	--
Cornell University	3	1
Stanford University	3	--
University of Iowa	3	1
University of London	2	1
Princeton University	2	1
New York University	2	--
Yale University	2	2
Heidelberg University	2	1
University of Wisconsin	1	--
University of Toronto	1	--
University of Pittsburgh	1	--
Northwestern University	1	1
Syracuse University	1	--
Washington University	1	--
University of Texas	1	--
University of Maryland	1	1
Wesleyn University	1	--
University of Pennsylvania	1	--
Massachusetts Institute of Technology	1	1

*One of the highly productive researchers on the journal roster did not have a doctoral degree.

**Includes Berkeley and U.C.L.A.

Private institutions played a greater role in the formal education of the scholars than did public institutions. The former awarded 58 per cent of the baccalaureate degrees and 61 per cent of the doctoral degrees. At the masters level public institutions awarded slightly more degrees (57 per cent) than did private schools.

The impact of private colleges and universities may also be reflected in the data which show that only three of the outstanding scholars took all of their work in public institutions. Of the remainder, 30 per cent attended only private colleges or universities and 60 per cent both private and public institutions.

TABLE 40

TYPE OF CONTROL OF INSTITUTIONS ATTENDED BY SCHOLARS

	B.A. N=31	M.A. N=23	Ph.D. N=31
Private	18 (58.0)	10 (43.4)	19 (61.3)
Public	13 (32.0)	13 (56.6)	12 (38.7)

Geographical Dispersions of Graduate Institutions

Geographically, northeastern colleges and universities were more highly represented in the sample than were institutions in other areas. Schools in this region awarded approximately 45 per cent of the bachelors, 42 per cent of the masters and 45 per cent of the doctorates compared to middlewestern schools which granted approximately 26 per cent of the bachelors, 30 per cent of the masters and 42 per cent of the doctoral degrees. Institutions in western United States awarded 23 per cent of the B.A. degrees, 22 per cent of the M.A.'s and only 6 per cent of the Ph.D. degrees.

Two scholars earned undergraduate degrees in foreign universities and two earned doctoral degrees in institutions outside of the United States. Only one southern university was selected for graduate study by members of the sample. Slightly less than 60 per cent of the scholars did not change their geographical locations during their formal education programs. Among the remainder, there was as much tendency for those in eastern schools to move to western schools as vice versa.

TABLE 41

GEOGRAPHICAL DISTRIBUTION OF DEGREE INSTITUTIONS ATTENDED BY THE SCHOLARS

	B.A. N=31		M.A. N=23		Ph.D. N=31	
	N	%	N	%	N	%
East	14	45.6	10	42.8	14	45.6
Middlewest	8	25.8	7	30.4	13	41.8
West	7	22.3	5	21.7	2	6.3
Foreign	2	6.3	1	5.1	2	6.3

Consistency and Change in Institutional Selection

Considerable institutional mobility may be seen in the data which show that only one of the scholars earned his three degrees in the same institution. Conversely, 29 per cent earned degrees in three different institutions. Of the 23 who earned masters degrees, only 5 continued in the same institution for their doctorate and among the 8 who by-passed the M.A., only 3 remained in the same university for their B.A. and Ph.D. program.

There was a greater tendency for the scholars to remain at their undergraduate institutions for the masters degree (22 per cent) than there was for them to take their masters and doctorate in the same institution (16 per cent).

TABLE 42

CONSISTENCY AND CHANGE IN CHOICE OF EDUCATIONAL INSTITUTIONS

	N=31
B.A. and M.A. in same institution	8
M.A. and Ph.D. in same institution	5
B.A., M.A. and Ph.D. in same institution	1
B.A., M.A. and Ph.D. in different institutions	9
B.A. and Ph.D. (no M.A.) in same institution	3
B.A. and Ph.D. (no M.A.) in different institutions	5

Selection Factors

The institution's reputation for scholarship apparently influenced the scholars when they selected their graduate schools. Approximately 36 per cent said that the general standing of the university was of highest importance in their selection of a graduate school and the remainder considered it of moderate importance. Approximately 55 per cent said that the reputation of a particular faculty member ranked high as an influence and an additional number said that the recommendation of friends or faculty members had markedly influenced their selection.

The availability of research opportunities was important for 40 per cent whereas the promise of a scholarship, an assistantship or some source of financial support was a primary selection determinant for nearly 50 per cent of the subjects. The availability of work for the spouse was an important factor only for the females in the sample although 9 scholars listed this as one source of their graduate subsidy.

Institutions which produced the outstanding researchers appeared to attract research-oriented persons to their own faculties. This was documented in the fact that the top five institutions in the production of the subjects in this study currently employed 42 per cent of the outstanding scholars in our sample.

TABLE 43

INSTITUTIONS WHICH CURRENTLY EMPLOY THE SUBJECTS

Academic Institutions*	Number	
California University	4	
Carnegie Institute of Technology	1	
Chicago University	3	
Columbia University	2	(1)**
Harvard University	4	(1)**
Illinois University	1	
Minnesota University	1	
Oregon University	2	
Pennsylvania University	1	
Southern California University	1	
Stanford University	2	
Washington State University	2	
Williams College	1	
Agencies		
American College Testing Program	1	
American Council on Education	1	
American Institute for Research	1	
Educational Testing Service	1	(1)**
Menninger Foundation	1	
Western Behavioral Science Institute		

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*Washington and Wisconsin Universities should probably be included in this list. Nominees were selected from these institutions but data were unavailable because the nominees were out of the country when interviews were held.

**Not available for interview.

The attraction that research agencies hold for some research scholars may be seen in the fact that 7 of the nominees worked in these types of organizations. Several of these persons held part-time research or teaching assignments in a nearby university.

Characteristics of the Subjects' Graduate Institutions

Institutional characteristics of their graduate schools as described by the subjects were analyzed under two classifications (1) research facilities and resources and (2) general climate for research. The latter included an appraisal of the institution's emphasis on research and the research activities of its personnel while the former included an assessment of the factors shown in Table 44.

TABLE 44

REPORTED ADEQUACY OF RESEARCH AIDS OR FACILITIES IN GRADUATE INSTITUTIONS WHICH AWARDED DOCTORAL DEGREES TO THE RESPONDENTS

	Good N=31	Fair N=31	Poor N=31	Not Available N=31
Library	28	2		
Laboratory	19	6	2	2
Advising on research	16	12	1	1
Consultants on research design	12	4	3	6
Space for research study	10	11	3	3
Subjects for research	6	12	2	5
Data processing aids	5	9	3	10
Funds for graduate student research	5	7	5	9
Research data pools	4	5		10
Editorial assistance	3	3	1	15
Computer services	2	7	3	14
Clerical assistance	1	1	2	24

Research Facilities and Aids

Because some of the research facilities and aids in current use (such as computers and data processing services) came into being after the majority of the subjects had completed their training programs, the data on these items in Table 44 are inconclusive except as trend indicators. However, the information on such basic resources as libraries, laboratories, study space and advising services are pertinent.

Ninety per cent of the respondents reported that library facilities at their graduate institutions were good and 10 per cent rated them as fair. Laboratory facilities were somewhat less satisfactory with 61 per cent rating them as good, 19 per cent as fair and the remainder as poor or not available.

Although very few institutions provided editorial or clerical assistance for doctoral students the few who did receive these services found them of immeasurable value in their progress.

The intrinsic value in an adequate study space during doctoral study was clearly evident when the questionnaire data on this item were analyzed with the interview responses. Respondents who had had adequate study space defined it as both a facilitating factor in their research progress and as a means of identifying closely with the total research milieu. Those who found these services inadequate or not available were united in their opinion that this had been a weakness in their graduate school education. In general, the respondents transferred their convictions regarding the importance of this facility into their present concerns and practices with doctoral students by trying to provide them space for this purpose.

Grants for graduate student research were available to only a few candidates and these were sporadic. For the most part they comprised small sums eked out of a professor's research funds and were used to conduct pilot studies or to underwrite data collecting, typing or similar costs related to research.

Data pools and subjects for research were available in good to fair measure for approximately a third of the respondents.

In general, advising and consultative services on research design were described as the most helpful aids in the doctoral program. The opportunity to talk about their own research appeared to rank as high as a facilitating factor as did the opportunity to receive advice and counsel.

The Research Environment

It is generally conceded that the optimal environment for research has certain unique characteristics. There was unanimity of agreement among the scholars in this study that the two most salient of these characteristics in their graduate institutions were (1) freedom and (2) nurturance. (The scholars were also unanimous in their opinions that the institutions in which they were currently employed ranked high in both of these prerequisites).

Although certain technical aspects of a free research environment (such as the right of self-determination and the provision of adequate facilities) were considered sine qua non by all respondents, other informal correlates of freedom also were described as indispensible. In fact, the informal freedom of the institution appeared to be regarded more highly by the scholars than the formal or institutionalized freedom. The former not only sustained the unorthodox or avant garde ideas and methods of the researcher but also provided him colleagues with whom he could examine their soundness and feasibility. For many, the ideal environment encompassed an interdisciplinary group looking at different aspects of a set of problems that were loosely related. When paraphrased, the comments of several subjects on this point portrayed the optimal research environment as one in which germinal ideas were free to flourish, budding ideas were not prematurely discounted and everyone participated in research as an integral part of the collegial activity.

The respondents reported that their institutions were ideal for research because in general they included colleagues who (1) were philosophically concerned about important problems, (2) had respect for one another's data, (3) reacted on a broad conceptual level and (4) were committed to the conservation, creation and communication of knowledge as wholly interrelated phenomena.

The nurturing aspects of their research environments were listed by the subjects as including favorable institutional attitudes toward research, fairly adequate seed or support money, light teaching loads and various other research accouterments such as a good library, adequate space and competent technical and clerical assistance.

Institutional Policies on Research

In each of the United States universities in which the subjects had taken their research degree (as well as in the institutions in which they were currently employed) research productivity was looked upon favorably as a criterion for promotion. In all but two of the degree institutions, the major portion of the graduate faculty were engaged in on-going research.

About half of the scholars believed that although the tangible rewards which accrued as a result of research productivity acted as incentives to research, most scholars tended to be self-generators whose drives were basically initiated by curiosity or by the excitement in discovering new relationships or in pioneering new ideas.

Personal Background of the Subjects

Age as a Factor in Research Productivity

One reason that has frequently been advanced for the low research output among doctoral recipients in education is the fact that they tend to be older when they receive their degrees than are doctoral recipients in other fields. Evidence of this age differential was strikingly noted when data for the 94 persons on the quantitative list of high research producers were analyzed. Among this group, the mean age for education majors at the time they received the doctorate was 4.9 years higher than the mean age for all other majors on the list taken together. These differences were even more pronounced when specific fields were compared. For example, in contrast to a mean age of 32.1 years for education majors at the time they received their degrees, Table 45 shows that the mean ages of the sociologists and the scientists in the group were 25.6 and 24.5 respectively -- a difference of nearly seven years.

TABLE 45

MEAN AGES OF HIGHLY PRODUCTIVE RESEARCHERS
AT THE TIME OF THE DOCTORAL DEGREE: BY FIELDS OF STUDY

Field	Mean Age at Time of Doctorate N=94
Education	32.1 Years
History	30.5
Political Science	27.7
Psychology	27.8
Scientist	24.5
Sociology	25.6

An interesting phenomenon was noted however when the same data were analyzed for the 31 scholars who were nominated "among the best researchers in their specialty."

Table 46 shows that the age differences that were marked on quantitative sampling failed to emerge on qualitative sampling. The mean age at the time of the doctorate for the total sample of 31 scholars was 28.3 years. The spread between the mean ages of the education scholars and the scholars in other fields in this sample was only 0.3 year. Thus, inferentially, it may be assumed that there is a correlation between age at the time of the doctorate and quality of subsequent research productivity.

TABLE 46

MEAN AGE OF THE SUBJECTS AT THE TIME OF THE DOCTORATE: BY SPECIALIZATION

Field of Study	Mean Age N=31
Education	28.5 Years
Psychology	28.2
Others*	28.4
Mean Age - Total Group	28.33

*Includes sociologists, political scientists, mathematicians, historians and natural scientists in the sample.

Time Sequence in Degree Programs

The majority of the highly productive researchers moved along in their educational programs without (or with little) interruption between degrees. Exceptions were clearly noted for the Ed.D. recipients whose mean age was 35.6 at the time of the doctoral degree. This was 7.3 years higher than the mean age of the Ph.D. group (28.3 years).

If the evidence that scholars and creative persons tend to contribute their major ideas by the time they are thirty is tenable, it may be safe to assume that an ideal age for completion of doctoral study would be around the age suggested by the data on the outstanding scholars. The fact that military service interrupted or delayed graduate education for nine of the subjects suggests that some downward scaling might be feasible.

Age at the Time of First Publication

When the 31 scholars were asked to indicate their age at the time of their first research publication the responses showed that 53.5 per cent had published by age twenty-five and 82.1 per cent had published by age thirty. These data support the interview data which showed that the majority of the subjects had had early immersion in research and early contact with scholars who encouraged them to report their findings.

TABLE 47

DISTRIBUTION IN AGE AT THE TIME OF FIRST RESEARCH PUBLICATION

Age	N=31	%
20-25	15	48.4
26-30	9	29.0
31-35	4	12.9
36 or over	3	09.7

Mean age of group at time of first publication = 27.1 Years

As shown in Table 48, three-fourths of the outstanding scholars in this study are currently age 50 or over. Since the subjects were originally selected on the basis of their research productivity during the past ten years, it may be inferred that the prime period for research output among researchers in education and the related fields lies roughly between 45 and 55. This is late in relation to researchers in other sciences.

TABLE 48

CURRENT AGE DISTRIBUTION OF THE SUBJECTS

Age	N=31	%
30-34	1	03.2
35-39	1	03.2
40-44	4	12.9
45-49	3	09.8
50-54	8	25.8
55-59	5	16.1
60-64	6	19.3
65 or over	3	09.8

Mean Current Age = 53.00 years
Range = 33-70 years

Relationship between Age at Time of Ph.D. and Research Productivity

The relationship between age on completion of the doctorate and number of publications may be seen in Table 49 which plots the data on these variables. Because

TABLE 49

AGE OF THE SUBJECTS AT THE TIME OF DOCTORAL DEGREE VERSUS NUMBER OF RESEARCH PUBLICATIONS

	Number of Publications					
Age at Ph.D.	0-20	21-40	41-60	61-80	81-100	101+
24-26 (N=10)	---	---	4	1	2	3
27-29 (N=12)	1	1	1	2	3	4
30-32 (N=5)	3	1	---	---	---	1
33-35 (N=2)	---	1	---	1	---	---
36+ (N=2)	---	---	---	2	---	---

approximately one-half of the subjects had publications which predated their doctoral degrees these figures may be somewhat misleading. However, the evidence in Table 49 supports the assumption that productivity in educational research is related to completion of graduate study at an early age. The 22 subjects who were 29 or younger when they received their doctorates were responsible for 91.3 per cent of all the publications produced by all the scholars in the sample.

Table 50 shows the relationship between the number of years that have elapsed since the completion of the doctoral degree and quantity of publication. Essentially, it shows that several of the more recent Ph.D. recipients have already published more research than many of the scholars who have been out of graduate school for considerably longer periods. To some extent this may reflect the impact of the recently introduced computerized methods of research. It may also reflect differences in the nature of the research undertaken by the various scholars.

TABLE 50

DOCTORAL DEGREE DATE VERSUS NUMBER OF RESEARCH PUBLICATIONS

Degree Date	Number of Publications 0-20	21-40	41-60	61-80	81-100	101+
N						
1923-30 (5)	---	---		---	2	3
1931-35 (6)	---	---	2	2	---	2
1936-40 (5)	1	---	1	---	3	---
1941-45 (5)	---	3	---	1	---	1
1946-49 (1)	---	---	---	---	---	1
1950-55 (7)	2	---	1	4	---	---
1956-59 (2)	1	---	1	---	---	---
Totals (31)	4	3	5	7	5	7

The evidence in these data demonstrate the need for an increase in the availability of post-doctoral research opportunities and for an appraisal of the amount of time new Ph.D.'s have for research during the early part of their professional careers. Earlier recruitment into research is also indicated.

Length of Residence While in the Doctoral Program

Closely related to the data on age at the time of the doctorate are the data on full-time versus part-time commitment to graduate study. None of the scholars in the study pursued his degree on a completely part-time basis. However, 9 subjects studied part-time during some stage in their doctoral programs. None spent less than a year in full-time residence and the range in residence length was from one to seven years. Forty-five per cent spent 2 years in full-time continuous residence, 29 per cent spent three years in continuous residence and 20 per cent spent 4 years in full-time continuous residence. One subject was in residence one year and one for seven years. The latter was a member of the faculty of the institution during part of this period.

Only two scholars took more than 4 years to complete their degrees. All but seven received their degrees within three years.

The subjects who worked part-time during their doctoral studies were generally employed on campus hence they were in easy contact with their departments and advisors.

Six scholars registered in absentia during some phase of their doctoral programs although this did not necessarily represent a discontinuity because the time was generally spent on data gathering or writing the dissertation.

Military service interrupted the doctoral program for four of the scholars who took leaves of absence during their graduate programs for this purpose. Five others served in the military forces between degrees.

These findings tend to support the assumption that outstanding and productive researchers tend to have been full-time students during the major portion (or all) of the doctoral program.

Financial Support of Graduate Study

Nearly half of the subjects reported that their main sources of financial support during graduate study were the stipends they received from fellowships or scholarships or from research and/or teaching assistantships. That these were inadequate sources may be seen in the fact that 49 per cent partially depended on income from part-time employment, 36 per cent on parental aid, 29 per cent on income earned by their spouses and 16 per cent were fully employed during some stage in their graduate program. Thirteen per cent took out loans.

TABLE 51

SOURCES OF FINANCIAL SUPPORT

	Prime source	2nd source	3rd source	4th source	Total using source
Part-time employment	2	4	7	2	15
Research assistantship	10	1	1	-	12
Teaching assistantship	5	7	-	-	12
Scholarship or Fellowship	4	4	4	-	12
Parent's aid	4	2	4	-	12
Savings	-	5	3	1	9
Spouse's job	-	1	4	4	9
Full-time employment	2	2	1	-	5
Loan	1	-	2	1	4
G. I. Funds	2	1	-	-	3
Income from investments	1	1	-	1	3
Relative	-	-	1	-	1

Only one scholar supported himself totally from one source -- a teaching assistantship. Thirty-five per cent depended upon four sources and the remainder received funds from two or three sources.

Three scholars received G. I. aid and 12 had had fellowships or scholarships. It is not entirely clear from the responses whether some respondents classified their research assistantships as part-time employment but the assumption is that some did.

Although the nature of their employment was generally related to their degree interests five of the scholars reported such vicarious sources of income as playing in an orchestra, writing for a trade journal, editorial work, translating and service as a student pastor.

Several subjects implied that they had lived a spartan-like existence during their graduate school period and at least one scholar commented that his preoccupation with financial pressure interfered with his full commitment to his study program and delayed his degree. The loyalties which many respondents expressed toward their advisors or toward other faculty members frequently appeared to be associated with the fact that these persons had been instrumental in assisting, in some way, in this private need of the respondent during his student days.

The spiraling costs and lack of support for doctoral students in education, and in the behavioral sciences, frequently emerged in the interviews as a matter which needed immediate correction. As they reflected on their concerns about their students the scholars often reported that they currently spent an inordinate amount of time trying to find sources of funds which would enable their students to continue their studies.

Some researchers said that they had reservations about outright grants for doctoral study -- because unsupervised, students sometimes made questionable progress -- but they saw no merit in requiring the student to make a strict accounting for his subsidy. Nor did they believe that there was any virtue or gain in "working one's way through graduate school" especially if the work was unrelated to the academic program. Several subjects expressed concern about inequalities in the distribution of student funds. They described cases in which a few students were over-subsidized while others, equally capable, received no support.

Highlights in the Development of Research Interests

Early Interests

Numerous facets of the activities of outstanding researchers and scientists have been studied in an effort to determine the possible components of their research ability. Studies by Roe, Clark, Gottlieb, Strauss, and others yield data which seem to indicate that although wide variations may be noted among researchers they appear to share such common characteristics as curiosity, strong interests, and the ability to work independently. Roe's studies of career choices suggest that interest may be a more important career determinant than aptitude.

When the subjects in this study were asked to trace the development of their interests in research their protocols revealed that (1) they had had numerous early interests of an inquisitive nature and (2) they had pursued these interests systematically and independently.

For purposes of analysis a crude classification of the interests described by the respondents was made under the categories of manipulative, quantitative and introspective or intellectual activities. (Obviously, some interests involved combinations of these skills). Among those who described interests which required manipulative skill were 16 per cent who said that they played one or more musical instruments and a similar number who systematically pursued an interest in music through record collections or regular attendance at concerts. One studied voice. Three subjects had played in orchestras and two had composed music. One of the latter had received a national award for his compositions. The other (who had organized and conducted his own orchestra) observed that he may have been drawn toward research because the perfectionistic demands of composing were analagous to the "analyzing, reanalyzing and polishing of data" required in research.

The internal logic required in "putting things together", in the structure and symbolism in languages, or in debating, and the manipulative skill needed in painting, sculpture, colored photography or in "gadget making" appealed to at least half of the scholars. Other interests of a manipulative and at least semi-artistic nature, were the design of mobiles, interior decoration and wood finishing.

Approximately 22 per cent described interests which involved quantification -- such as an interest in mathematics per se or in games and other activities which stimulated mathematical reasoning.

Science as an area of interest was traceable in activities which included independent work in a home chemistry laboratory, field experiences in rock collecting, biological and botanical pursuits which ranged from moth collections, hybridizing orchids and gardening, to other forms of agricultural science -- such as raising farm animals.

Four of the psychologists mentioned that they had had an early interest in social service. The work of rehabilitating men or delinquent boys appealed to at least four members of the sample who had volunteered for this activity as students through their religious affiliations or through clinical agencies. Four others said that they had had an early interest in teaching. One recalled that as a child he had formulated many psychological concepts as a result of his interest in observing variations in behavior.

Although one of the sociologists admitted that he had very little social consciousness in his early development, the remainder in this field said that they had had an early and a sustained interest in social and political causes, campus politics or the problems of the times.

In general, the historians were interested in questions which centered on the development of groups of people and in mass movements. These interests were generally pursued passively through reading although one reported that he had physically re-traced the route of a pioneer trail to test its feasibility and the authenticity of its recorded accounts.

Of the scholars who mentioned that they had been, or were, interested in sports, only four had regularly participated in group games (football and baseball). The remainder were interested in sailing, fishing, tennis, hiking, golf or activities which may be described as solitary or as involving few participants. One was interested in flying and had recently earned a pilot's license. Most of the scholars reported that they had developed an avid interest in reading at an early age. Some said that at age 9 or 10 they read a dozen or more library books a week. Although most of their current scholarly reading was described as functional, the compass of their non-research reading included politics, world affairs, travel, history, sports, theater, music, art, science and biographies. Very few reported that they read fiction.

Pre-University Incentives Toward Research

About 20 per cent of the respondents traced the beginnings of their research interest to high school or undergraduate experiences. Science courses generated a research interest in four of the subjects and two others became interested while participating in psychological testing programs during high school.

The influence of research-oriented teachers at this level was a potent factor for six of the scholars. These were instructors who raised interesting questions, challenged students to search for solutions and gave them wide independence and firm support if they did so.

In a few cases, college experiences failed to sustain or promote the interest developed at the secondary school. As a result, several of the scholars lost momentum in their progress or dropped their original interests entirely because of lack of encouragement or direction. One man, who had been awarded a chemistry scholarship and given advanced placement in college, reported that he dropped chemistry as a major after working independently for one year during which time not one professor asked about his work or the progress he had made. Other guidance inadequacies such as over-direction caused subjects to become diverted or to delay their research commitments. On the other hand, several positive aspects of guidance were reported such as that of one scholar whose junior year paper in math was the impetus for a dialogue which lead to a research partnership that has lasted throughout the years. In another case, undergraduate employment as a statistical clerk led the subject to a major in that field.

In three cases, parents were cited as the model or source of initial encouragement. Two other scholars said that they first became interested in research after reading the biographies of outstanding scientists. Many described incidents that emphasized the degree to which serendipity operated in their research progress.

Intellectual Disposition as Measured by the Omnibus Personality Inventory

In an attempt to measure their interests systematically, the subjects were asked to take the Omnibus Personality Inventory. Twenty-six returned these forms completed.

While intelligence of a relatively high order is undoubtedly essential for a career in research, additional psychological correlates of creative and intellectual performance have been identified. These include an interest in ideas, esthetic orientation, tolerance for ambiguity and autonomy. The Center for the Study of Higher Education, Berkeley, has been engaged in the development of measures of intellectual disposition and in an approach to such assessment, special emphasis was given to the measurement of the intellectuality correlates listed above. In measuring intellectual disposition through the use of scales in the Omnibus Personality Inventory*, the pattern and weighting of scale scores differs from that normally followed in assessing creative personalities. However, in the area of academic performance there are some commonalities.

Intellectual disposition as defined here does not imply mental aptitude, achievement or educational aspiration. Rather, it is used to describe a basic orientation and a style of thinking which includes an intense interest in intellectual and scholarly pursuits, in the use of reasoning, and an openness to and an active seeking out of the esthetic. Patterns on the first six scales on the O.P.I. provide an operational assessment of intellectuality as defined above. The first scale, Thinking Introversion, measures one's tendency toward reflective thought or abstract thinking; Theoretical Orientation assesses one's interest in problem solving, science and scientific methods; Complexity, one's tolerance for ambiguity; Autonomy, one's need for independence and non-authoritarian thinking and Religious Orientation, one's degree of religious subscription or skepticism.

Profiles of the Scholars on Intellectuality Scores

The mean standard scores** of the outstanding scholars on these six scales are shown in Table 52. Using these scores as a reference point, the scholars, as a group, may be described as liberal, autonomous and disciplined individuals. Their tendency to be rational, introspective and cognitively involved in the "real world", as well as their need to know, and to understand, as reflected in their interest profiles, is probably related to their high research productivity.

TABLE 52

THE SCHOLARS' MEAN STANDARD SCORES ON THE
INTELLECTUALITY SCALES OF THE OMNIBUS PERSONALITY INVENTORY

Scales	Mean Standard Scores** N=26	S.D.
Thinking Introversion	60.1	5.59
Theoretical Orientation	64.2	3.73
Estheticism	53.0	4.80
Complexity	57.5	4.54
Autonomy	67.4	5.73
Religious Orientation	63.6	2.96

As a group, their potential for creative and original expression or broad intellectual interests is somewhat attenuated by their scores on Estheticism and Complexity. The elevation in their scores on Theoretical Orientation indicates a disposition toward exploratory diagnostic thinking but in a disciplined, rational fashion. However, about a third of the subjects had sufficiently high scores on the Estheticism and Complexity scales to indicate a somewhat higher potential for original and creative behavior. Among the latter group, the level of their scores on these two scales (and on Autonomy) averaged one and a quarter standard deviations above the mean of the normative sample. Among the remainder, their relatively high scores on TI, TO and Au, and somewhat lower scores on Es and Co, reveal a problem-solving orientation and a scientific approach to professional tasks or to the environment.

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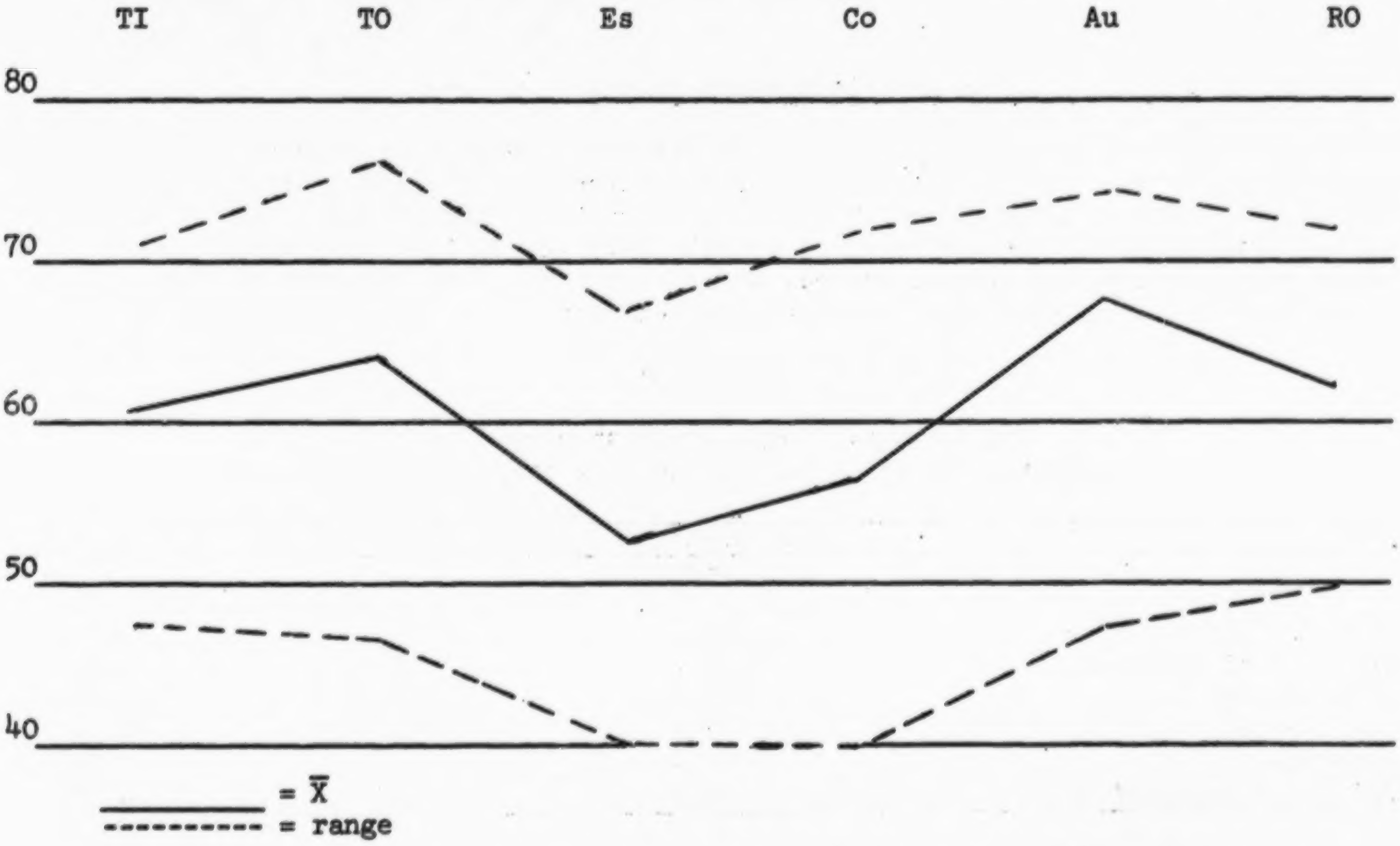
*The Omnibus Personality Inventory is made up of 350 items and the format is similar to the Minnesota Multiphasic Inventory. Scale reliabilities are in the high eighties and nineties on internal consistency and test re-test checks. The scales have been validated against known criterion groups, faculty ratings, correlations with other scales and observed phenomena.

**A score of 50 represents the midpoint in a large normative sample of undergraduate freshmen who represented (1) a great amount of heterogeneity on several characteristics and (2) whose mean academic ability scores were at least equal to or above the national average for college students.

Figure 1, which shows the range in the subjects' scores on the first six scales of the Omnibus Personality Inventory, illustrates the diversity of personality characteristics represented in the sample. It also suggests that educational problems are so diverse in nature that they tend to attract individuals of varying intellectual interests and dispositions.

FIGURE 1

RANGE IN OMNIBUS PERSONALITY MEAN STANDARD
SCORES ON SCALES MEASURING INTELLECTUAL DISPOSITION
N=26



For purposes of analysis the sample might be divided into two groups based on an eight category Index of Intellectual Disposition prepared at the Center. Briefly, this involves a system of categorization in which the individual's pattern of scores on Thinking Introversion, Theoretical Orientation, Estheticism and Complexity are the primary criteria and his scores on Autonomy and Religious Orientation are the secondary criteria.

Group A includes those individuals whose scores indicate a strong disposition toward creative, original or innovative work (such as fundamental or basic research), and Group B includes those whose interests are more characteristic of the rational, diagnostic analyst such as the person who is oriented toward the utilization of findings and perhaps toward the improvement of systems.

The high scores made by both groups on Theoretical Orientation indicate that both take a logical and critical approach to problems and are challenged by them. However, the disparity in their mean scores on Thinking Introversion indicates that the scholars in Group A tend to be more interested in the "satisfactions" of abstract or reflective thinking and to have a broader range of interests in literature, history, and philosophy than do the scholars in Group B, who tend to stress objectivity and the achievement of solutions in their approach to problems.

TABLE 53

MEAN STANDARD SCORES ON THE OMNIBUS PERSONALITY INVENTORY SCALES ASSESSING INTELLECTUALITY: GROUPS A AND B

Scales	Group A Mean Standard Scores	S.D.	Group B Mean Standard Scores	S.D.
	N=11		N=15	
Thinking Introversion	65.6	2.9	54.2	4.9
Theoretical Orientation	65.3	3.8	62.2	7.8
Estheticism	60.6	2.7	44.5	4.7
Complexity	59.8	4.9	53.6	8.9
Autonomy	70.6	2.3	62.9	7.3
Religious Orientation	65.3	3.0	62.6	5.3

A difference of one and a half standard deviations between their mean scores on Estheticism further illustrates the dissimilarity between the two groups of researchers. Group A tends toward a much greater interest in art, dramatics and literature than Group B. These findings were substantiated in the interview data when the scholars were questioned about their non-research interests and avocational pursuits.

The scholars in Group A also have a greater need for independence and are somewhat more tolerant of ambiguity than the scholars in Group B whose scores on Complexity and Autonomy indicate a limited and more structured perception of experience and events.

Profiles on Scales Measuring Affective Behavior

Groups A and B were similar to each other, but below the normative sample, in their mean scores on Social Extroversion. Although this may indicate a tendency to withdraw from social contacts, their high scores on Altruism indicate that they are not socially aloof nor alienated and that they have an awareness of and a feeling for the welfare of others. From the standpoint of research scholarship, their low Social Extroversion scores could be interpreted as a strength insofar as they may indicate that these persons can be free of others and protective of their time. A few may be so involved with social issues and with the problems of others that they are uneven in their work habits. The breadth of their interests may also lead them to concentrate in more than one area. This was evident in the bibliographical data of some subjects in which certain citations reflected a digression from research into areas involving important social or community issues.

In general, on measures assessing affective behavior the two groups of scholars are not greatly dissimilar. Their mean scores on Religious Orientation, which purports to measure one's degree of religious subcription or skepticism, indicate a liberal view of religious beliefs and practices and probably a rejection of those that are orthodox or fundamentalistic. On scales measuring readiness to express impulses or to seek gratification consciously and overtly, the two groups are similar both to each other and to the normative sample. Their scores on Impulse Expression, Personal Integration and Anxiety Level are characteristic of those made by individuals who have a healthy mental outlook, are personally and socially well-adjusted, confident, assured and in control of their fantasy lives.

The lower scores on Altruism made by the scholars in Group B reflect a tendency among the persons in this group to be somewhat less other-oriented, less personal, and probably more distant in their relations with others than are the scholars in Group A. The somewhat higher scores made by Group B on Practical Orientation portray an inclination among the members of this group to be interested in research that has utilitarian value.

The subjects in Group B tend to deny interests in esthetic matters. Although both groups are masculine in their attitudes, Group B is somewhat more masculine on the MF scale than was Group A whose members admitted to greater sensitivity and more emotionality than did the subjects in Group B.

Comparison of Subjects with Creative and Productive Social Scientists

In an attempt to look at similar groups of scholars, the O.P.I. scores for a highly productive group of social scientists were compared with the scores of the Group A subjects in this study. Data on the social scientists were previously studied by the staff of the Center for the Study of Higher Education.[1] The profiles for the two groups are shown in Figure 2 and the comparative scores on the scales on the Intellectual Disposition syndrone are shown in Table 54 .

FIGURE 2

MEAN STANDARD SCORES ON THE OMNIBUS PERSONALITY INVENTORY SCALES MEASURING INTELLECTUALITY: CREATIVE SOCIAL SCIENTISTS VERSUS SUBJECTS IN THE STUDY

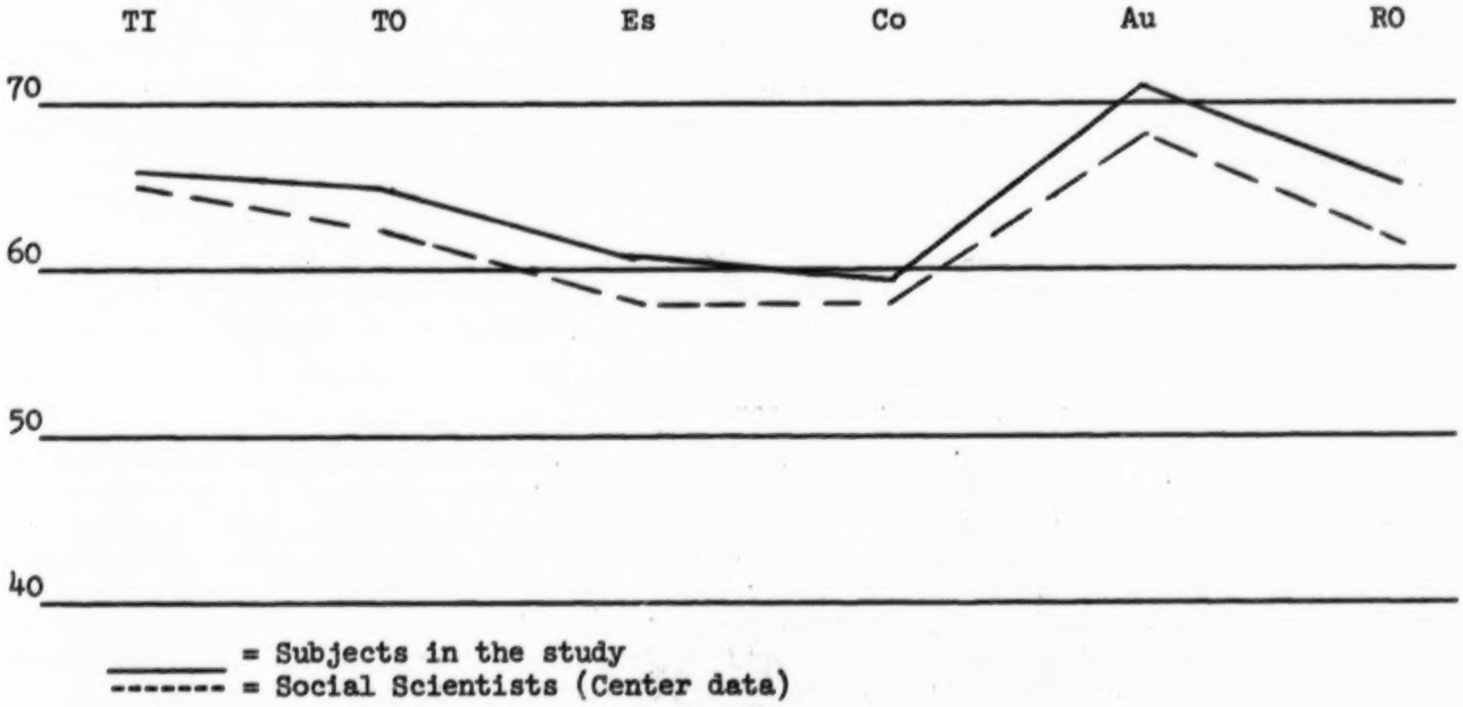


TABLE 54

COMPARISON OF MEAN STANDARD SCORES ON THE OMNIBUS PERSONALITY INVENTORY SCALES MEASURING INTELLECTUALITY: GROUP A VERSUS CREATIVE AND PRODUCTIVE SOCIAL SCIENTISTS

Scales	Mean Scores Group A	S.D.	Mean Scores Social Scientists	S.D.
Thinking Introversion	65.6	2.9	65.2	4.1
Theoretical Orientation	65.3	3.8	62.6	2.4
Estheticism	60.6	2.7	58.6	3.2
Complexity	59.8	4.9	58.9	2.7
Autonomy	70.6	2.3	68.5	3.6
Religious Orientation	65.3	3.0	61.5	2.8
Social Extroversion	43.5	9.2	62.0	5.3
Impulse Expression	52.8	7.9	56.0	4.7

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[1] The Omnibus Personality Inventory - Research Manual, Center for the Study of Higher Education, University of California, Berkeley, p. 54.

Sub-groups within the Sample

Although the N's are small, it is of some interest to compare the profiles for three sub-groups within the sample: the educators, the psychologists, and the remainder of the subjects seen as a third entity. Descriptively, the educators appear to be more other-directed and psychologically involved with others, the psychologists tend to be analytical, goal-centered and deliberative and the social scientists reflect characteristics which point to constraints, some degree of dilettantism and a greater readiness to seek gratification in overt actions.

FIGURE 3

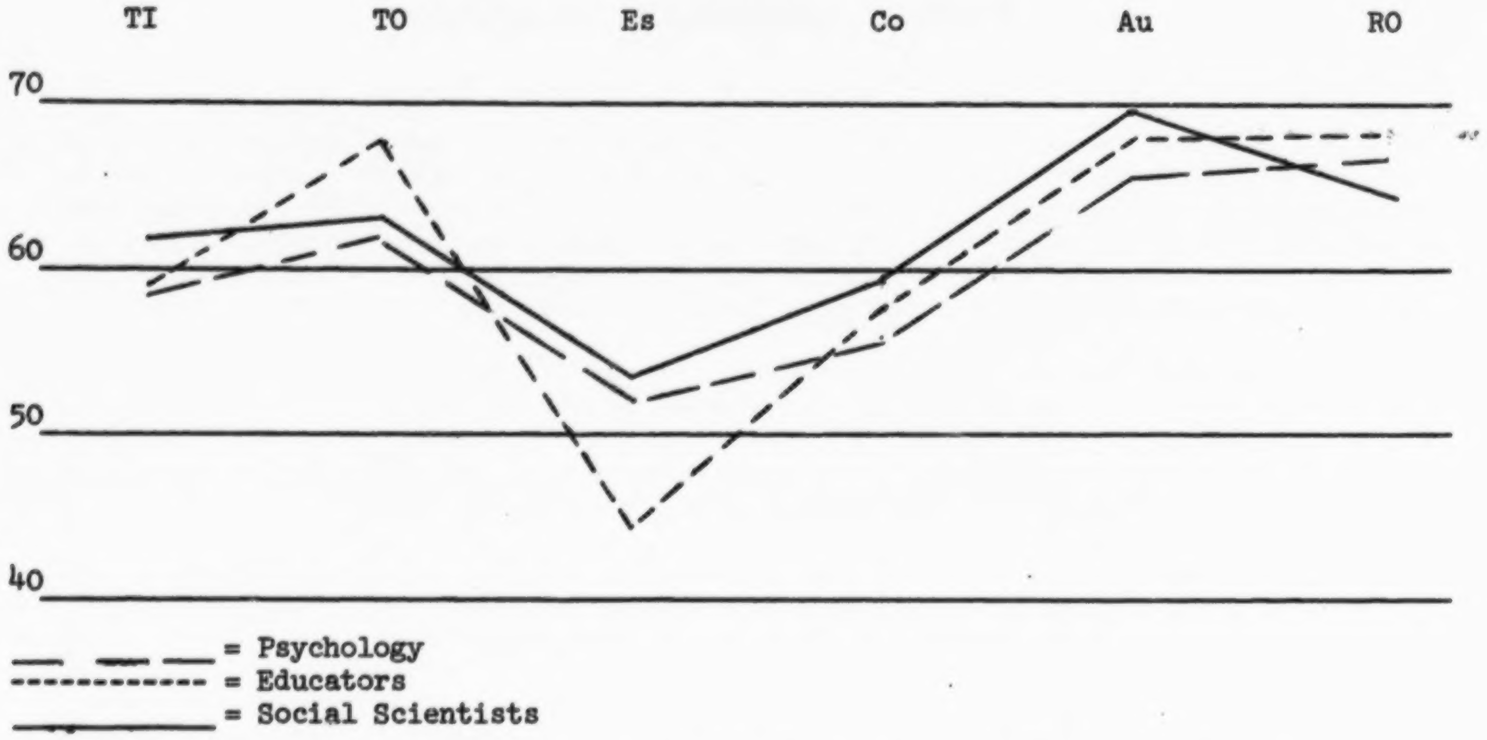
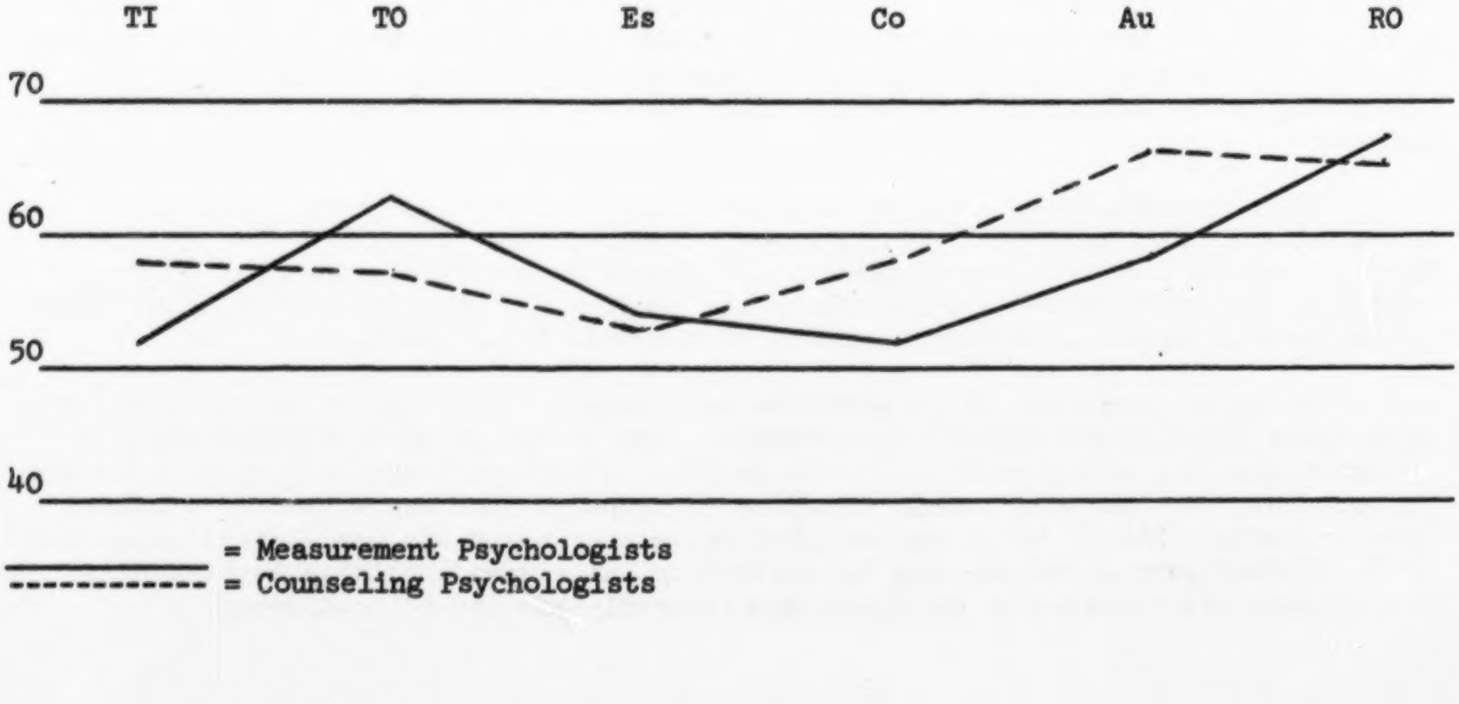


Figure 4 compares the profiles of two groups of psychologists in the sample. Of interest are the lower scores of the Measurement Psychologists on Complexity and Thinking Introversion and their higher scores on Theoretical Orientation. The Counseling Psychologists, on the other hand, appear to be more interested in introspective thinking and in complex problems and show a greater need for independence.

FIGURE 4



In summary, the scholars in this study show two different interest profiles; one includes those who express an interest in a type of research that inquires innovatively and the other includes those who show an interest in problem solving or experimentation. The profiles also point up differences in the foci of their interests. One group may be interested in the search for significant questions; the other may be more concerned about answers. Obviously both types are needed in educational research.

The O.P.I. data on the outstanding researchers suggest that education tends to draw individuals who are less interested in the arts and literature than in problem solving or experimentation. Probably more attention is needed in this area of their training and selection.

Research Productivity of the Subjects

Publications

An analysis of the bibliographical and questionnaire data disclosed that more than half of the subjects had published at least one article before the completion of their graduate work and all except one had published within one year after receiving the doctorate. In contrast to the 1954 doctoral recipients in education who published an average of 2.3 articles during the ten years following their degree programs, the 31 scholars averaged 2.9 articles per year for their first ten post-doctoral years.

The master's thesis appeared to be the impetus to publishing for 45 per cent of the respondents whose first articles were based on their research at this level. Another pre-Ph.D. impetus was an invitation extended by a professor, or by a co-researcher, to cooperate as a joint author. Close to 40 per cent of the respondents reported that they had published under this arrangement while in graduate school.

Approximately 30 per cent of the respondents had read a research paper at a professional meeting while still a graduate candidate. Many gave credit to their sponsors or to a faculty member for instigating this experience.

A quantitative analysis of the subjects' bibliographies showed (1) very few breaks in publishing continuity and consistency, (2) a gradual increase in the number of publications per year, (3) a tendency for early publications to reflect sole authorship and for later ones to involve joint authorship and, (4) a tendency to use professional journals as the primary publication organ for early writings but to use monograph, chapter or book form (as well as journals) for their more recent efforts.

An assessment of the topical nature of their publications showed that although some took occasional excursions into other areas only two subjects departed noticeably from the research area in which their initial work was concerned. This tendency was supported by interview data in which the subjects said that although their research perspectives had been expanded by experience and exposure to other scholars, the range of their research specializations had not appreciably widened. On the other hand, their non-research publications frequently reflected a variance or a new dimension of interests.

Table 55 demonstrates the writing prolificness of the subjects. Although speeches, reviews, duplicated translations and other non-research entries were deleted from the tabulation, it was not possible to determine accurately how many separate research contributions were indicated by the remainder of the citations. Some subjects wrote several papers on separate aspects of the same investigation.

The early launching of the subjects into research publication may be associated with their first post-doctoral appointments. Ten of the group took assignments in research agencies after receiving their Ph.D.'s, seventeen accepted faculty positions in universities, two held college teaching appointments and one worked in a public school system. Six of those who accepted university positions immediately after their Ph.D. studies were given the rank of Instructor, nine were appointed Assistant Professors, one received an Associate Professorship and one a Lectureship.

TABLE 55

NUMBER AND TYPES OF PUBLICATIONS BY THE SCHOLARS

Books authored	81
Books co-authored	60
Books edited	22
Books co-edited	1
Books translated and edited	1
Chapters or Monographs	473
Journal articles authored	1257
Journal articles co-authored	639
Total number of publications	2584

Since university awards are largely predicated on research productivity, the desire for advancement may be seen as one catalyst to publication. The fact remains, however, that more than half of the subjects had published research papers prior to the completion of their graduate work. It seems reasonable to assume that the climate of research in which the subjects were placed and the commitment of the individuals to research were as conducive to productivity as were the rewards.

Inferentially, a relationship may be found in the fact that the median year in which the scholars completed their doctorates (1940) coincides with the period in academic history in which externally supported or sponsored research became a potent influence in universities.

Preparation for Research Writing

Some investigators have suggested that much of the confusion and lack of understanding about the process of producing research is a consequence of the popular notion that the procedure for doing research is the same as the procedure for reporting it. They note that although the subjective experiences of the researcher appear to be important factors at both stages they are particularly significant at the reporting stage. This phenomenon was substantiated by the scholars in this study. When they were asked to comment on the development of their ability to write for research, the respondents clearly demonstrated that the sense of satisfaction they derived from the creative or discovery aspects of their efforts did not extend to their communication of it. For many, the doing represented a self-fulfillment which the reporting curtailed. The latter apparently was performed out of a sense of duty; the former out of a sense of adventure.

Only five of the subjects reported that they found research writing easy. The remainder described it as a laborious, tortuous process which exerted considerable psychological stress. Some scholars implied that the tradition which dictates that research must be stated in value-free statements or in statistical formulations had the effect of reducing research writing to technical reportings which were often unintelligible to those who could profit most by their findings. One scholar stated that by adopting the methodology and reporting techniques of the physical scientist, which are non-threatening in terms of ego involvement, educational researchers had practically closed the door on creative approaches. He reasoned that the nature of many educational problems cannot be as precisely stated as problems in the physical sciences. Hence, he argued, in seeking new knowledge in education, the investigator should freely create his own methods and his own distinctive reporting style.

Only two of the scholars had had any formal training for research writing per se. College English courses were mentioned by about half of the subjects as being somewhat effective but the majority said that the critical evaluation of their papers in graduate school, either by professors, colleagues or by other graduate students had been of major effectiveness. On the other hand, about 30 per cent said that they had never had a realistic assessment of their writing ability during their graduate programs. Several described the trauma, discouragement and resentment they felt when they faced editorial criticism the first time they submitted a paper for publication.

About 20 per cent of the respondents said that they had had rather undistinguished careers in their English courses in college. One of the most prolific writers in sociology noted that his grades in college English had been A, B, C, D. Four of the subjects had taken remedial steps during graduate school to compensate for what they described as their writing deficiencies. One of these said that he took an extension course in which he systematically schooled himself to write simply and "with a minimum of pedagoguese". In contrast to those who reported problems in expressing their ideas, many of the respondents said that the papers that they had written in graduate school were the medium through which they initially became associated with particular research professors or sponsors.

Encouragement as a Factor in Writing

Those who enjoyed writing usually attributed their interest to a brilliant or encouraging teacher or to a parent who had stressed the importance of expressing oneself precisely. Most of these subjects had had teachers who required frequent written exercises or research papers. About a third attributed their ability to the constructive evaluations they had received on their papers during graduate school. Although many of the subjects said that they disliked research writing this negative reaction did not appear to extend to other forms of literary expression. More than half of the scholars reported that they enjoyed writing thought-pieces in the form of essays, commentaries, books or journalistic articles. Three said that they had prepared the manuscript for novels; four had written plays; another had published poetry. One of the subjects had subsidized his education writing for a trade journal. Another had done so by serving as a news reporter for the Radio School of the Air. Three had written translations of manuscripts, one had edited a book as an undergraduate and six had worked on their college or high school newspaper.

Some clue to the origins of their high verbal fluency may be found in the fact that practically all of the subjects included the enjoyment of reading as one of their related interests.

Explicitly or implicitly most of the scholars said that they were sensitive to criticisms of their writing and that their goal was to write so clearly there would be less and less possibility of anyone misunderstanding what they meant. Several psychologists expressed admiration for the mathematical elegance and clear writing of certain colleagues on whom they modeled their own efforts. Most of the scholars said that they rewrote as many as five revisions of their research reports or books. Almost all submitted their papers to their colleagues for a pre-publication review. The foci of this review was the writing as well as the substantive aspects of the report. Apparently, there are large bodies of research data lying fallow in files of the subjects because the effort involved in getting it into publishable form involves "pure lucubration". One scholar estimated that he had ten or more reports written that needed "polishing". Another said that he couldn't finish a phase of a study without writing it down in draft form but his greatest obstacle to completing these was the lack of time. He noted that currently his research writing was limited to week-ends or to nights spent in hotels when he was on the road as a consultant or attending conferences.

The Role of Journal Editors

Journal editors and editorial policy were severely indicted for discouraging innovative ideas and for freezing the style of research-writing. The words of two interviewees epitomized the criticism of 25 per cent of the subjects. One charged, "Editors are too often interested in old stuff and puzzlied by the new." Another stated, "A.P.A. should have more eclectic control of research outlets. I know of some excellent research that has been turned down because of the high specificity of the current editorial supervision." The brevity demanded by some journal editors moved many of the scholars to welcome the trend toward research anthologies which afford the researcher freedom to present his study in more adequate detail.

The character and quality of editing was severely criticized by several of the subjects and one interviewee was particularly critical of the mask of anonymity which shields some editors from responsibility for their editorial acts. He stated that:

> Editors have a rare opportunity to say things from ambush that they wouldn't say openly. I have seen young people absolutely devastated by their criticism. We must do something about editorial criticism to prevent young researchers from getting discouraged and losing their keenness for research. Reform in which editors sign their criticism is needed.

Methods for Getting Students to Publish

When the scholars were asked whether they had any particular method or technique for getting their students to publish, the majority said that they considered themselves remiss in this respect. Encouragement was the principal technique used but other devices included offers to edit, to write an introduction or the opening paragraph, invitations to the student to become a joint author and offers to find a source and/or the funds to subsidize the publication.

Two of the scholars said that they gave their students a format and required them to prepare a manuscript as a journal article based on their dissertations. Some offered their apprentices an opportunity to write up that portion of the study on which they were assisting. One helped to develop a journal which his students used as an outlet for their own research. In general, the subjects tried to impress their students with the importance of sharing their research ideas and getting feedback through publications. Some said that they frankly pushed their students to write and did not let them think they were finished until their research was published. These subjects reported that they reviewed drafts, re-organized material and used "lots of red ink to mark up or to show the tricks of getting points across". Said one subject:

> I pay great attention to the essays my students write--I take days and read carefully. I diagram structural errors--advise them to go to the dictionary--I write in margins. I read each paper carefully--In this way I lose precious time but I think it helps the student--I try to get them interested in the illusion words can create--I go over my comments and ask the students to do so carefully--In fact, I weedle, flatter, and flatten the students--I ask them to try to accept their role as a student--a learner, by not letting their feelings get hurt by criticism--by divorcing themselves from ego involvement. I urge them to read their stuff 10-12 years later.

Another commented:

> Students don't realize that professors send their papers around. This should be regarded as a professional service--the advantage of criticism is what he is paying for. He needs the distance of an analyst.

The Impact of the Graduate School

Gottlieb's hypothesis that career preferences are modified by contact with the graduate school appeared to be supported by the data in this study. Although a few scholars could cite some pre-university experiences which had motivated their initial research interests, the majority said that their enthusiasm was sparked by the atmosphere of research generated by their graduate institutions and faculties.

Graduate Courses

Graduate courses piqued the research interest of 94 per cent of the scholars. Many subjects endorsed their coursework as stimulating learning experiences because they placed continual emphasis on the analysis and criticism of theories, on methodology rather than on conclusions, and on basic and difficult questions rather than on simple answers and neat procedures. Is it a fruitful idea? What is the evidence? How do you support that view? What would you do the next time? were typical queries in these classes. The provocative effect of this experience infused the subjects with a respect for their field and for the important problems in it. In the words of one subject, "It was more respectable to be wrong in our discussions of significant problems than to be right about picayune ones."

The scholars reported that they had carefully selected those courses which emphasized the search for fundamental solutions and the development of critical insight and respect for data. However, they were in common agreement that formal courses were helpful only insofar as they stimulated independent reading and fostered discussion. They also agreed that because the number of required courses had been held to a minimum they had had more time to devote to research experiences.

Faculty Encouragement

An ancillary, if not pre-disposing, factor in the development of their research career was the encouragment and support received from their major adviser and/or other faculty members. When the subjects were asked to indicate what persons had been instrumental or important in the development of their interest in research each mentioned at least one professor who was directly or indirectly influential - or instrumental - in this development. Twenty-five subjects credited their advisers as "very important influences" in the growth of their careers. Although a small number implicitly or explicitly stated that their advisers had been of indifferent value to their research progress each of these cited other research persons whose influence had been strong.

Some subjects described confidence-building incidents in which a professor had singled them out in response to a paper they had written, a question they had raised or a comment they had made in class, or because a former instructor had commended the student to the professor's attention. These direct, personal communications from research professors were generally construed by the recipient as encouragement in the direction of a research career. The catalytic effects of such incidents were documented in statements such as the following:

> Professor_________said that he was interested in the ideas in my paper and suggested that I plumb them. He got me a research assistantship. I was bitten -- I've been doing research ever since.

A close coherent involvement with outstanding creative professors in whose research they assisted gave reality to research for many of the subjects. Through direct interaction, the candidate was given the opportunity to observe excellent models and to put his course work in perspective. Some subjects praised their professors for prodding and pushing students into involvement with original research. Other professors were commended because they involved students in their own research and recognized their contribution by citing them as joint authors of the published results. Still others gave their students access to raw data and left them free to search out and explore side problems of their own. In general, the subjects reported that the teasing effects of contact with devoted, hard working faculty researchers, the challenge of knotty problems, the excitement of sharing ideas and the freedom to probe heuristically was hard to resist. For many a research career pattern was set during their first direct encounter with a research-oriented faculty member. For most, this occurred early in their graduate programs. Once research became the center of their world, other interests became peripheral. As one subject noted: "While we internalized our career interests, we were really internalizing a whole way of life."

Student - Adviser Relationships

With minor exceptions the student-adviser relationships in the graduate institutions which the subjects attended were cordial and informal. For the most part classes were small and competition for an adviser's time was not threatening. Often the adviser had only one or two advisees. Conferences and classes were generally held in the professor's office or home and seminar discussions often continued on into after class social hours. Respondents described their faculty-adviser relationships as "a partnership" or "a company of equals" in which "collegial sympatico" generally ensued.

Twenty-nine of the subjects stated that they had had good or fair relationships with their major professors. The professional respect and friendship they held for their mentors were frequently expressed through references to experiences or contacts which the adviser had arranged to expedite their research interests or careers. Sometimes these contacts involved experiences with scholars on other campuses, in related fields or in off-campus agencies.

The quality in the major professor which won deep appreciation was his tolerance for independent spirits. Many subjects were pleased with the fact that they had been free to work alone on their research ideas but were equally free to ask for any advice they needed.

Every scholar pin-pointed a person or persons who had been instrumental in encouraging his research interest either by providing the means whereby these interests were implemented or by giving him personal assurance of his potential or both. Through research assistantship stipends, grants or salary from a professor's research funds, personal gifts or loans and similar sources, the scholars found supportive aid and encouragement in their pursuit of a research career.

Two respondents reported that they had had negative relationships with their major advisers. In one instance, the adviser had completely neglected his advisorial responsibilities and thus the student made slow and uncertain progress and in another case the adviser over-directed his student's reserach.

There was evidence in the interview protocols that in addition to their major professors many other persons had served in an advisory or consulting capacity for the respondents. A total of 77 different persons were named as influential in the development of their career interests. Many of these persons were named by several respondents (and several so cited were members of the sample for this study).

The transfer value of these experiences was apparent in statements like the following:

> I often think of and apply___________ methods. That is, I remember how he influenced my career by keeping after me to finish my degree--helping me to get a job and remaining interested in me after I finished. I find myself taking this same interest in my students.

The Research Environment in Graduate School

When the respondents were asked to describe an optimal research environment for doctoral students, the general air they described did not differ essentially from that which they considered optimal for themselves. There was unequivocal agreement among them that the single imperative in a successful research training program was that the novice be surrounded by, and involved with, those who were actively doing research, preferably on an interdisciplinary basis. This had the pluralistic effect of providing the student with models, helping him to become aware of significant problems, exposing him to a variety of methods, immersing him in data and furnishing him opportunities for learning the social psychology of group process or team research.

More than 90 per cent of the scholars said that by operating on an interdisciplinary basis the student could learn to conceptualize research problems from a number of perspectives and fortify his research competency by bringing to bear on his own projects relevant ideas and methods from other disciplines.

There was absolute consensus among the scholars that professors who are not active in research should not direct doctoral programs although several conceded that "idea people" served an important function even if they did not do research themselves.

The Physical Environment for Research

Although the animating principle in the research climate was collegial interaction in on-going research, the respondents were in common agreement that certain physical prerequisites were also important for the doctoral candidate. Among these were adequate library facilities, study or work space, and a commons room for informal discussion or meetings.

About 75 per cent of the scholars noted that when they were graduate students they had been generously provided with office and/or laboratory space. In addition some had been provided books and supplies, clerical and typing assistance and, in a few cases, editorial aid. One subject said that the office and technical assistance he currently enjoyed as a faculty member were originally assigned to him as a graduate student in the same department.

The subjects evaluated the propinquity of laboratories, offices, research facilities, libraries, and consultants as highly important aspects of the research environment for doctoral students. In their description of the physical environment for research about 80 per cent included the provision of a definite area where faculty and students could gather for informal discussions. In their judgment, areas so designed served to foster spontaneity of interaction about research problems and helped the student to identify with the research activity and personnel around him. In the words of one respondent,

> Because of the family nature of out building everyone knows about everyone else's research. We can get excited about research - how it progresses ... Students and faculty together ... several departments are getting new buildings for their research and they want desparately to set up a situation which has this atmosphere.

Judging by the remarks of those who commented on this point, the research units which operated in a small (and usually an old) house were more satisfactory for integrating the research group than were the office-type, functional structures of the larger buildings on campus whose traffic patterns often discouraged or minimized interaction.

Doctoral Degree Requirements in the Subjects' Programs

Many subjects reported that they had difficulty in describing the precise nature of the requirements in their doctoral programs. They attributed this largely to the fact that their graduate institutions had minimized the mechanics of degree process and concentrated on those educational experiences which focused on the student's educational goals. Apparently, the institutions attended by the subjects gave broad descretionary power to the student and his adviser in the selection of a program of study and a wide degree of freedom in choosing alternatives to specific requirements. In only three cases were respondents critical of the requirements and these centered on weaknesses in certain core courses and on the rigidity with which an adviser interpreted the requirement.

Examinations

Eleven of the subjects were required to take a standardized test before being admitted to the doctoral program. These were generally the Miller Analogy Test and the Graduate Record Examination, however several were required to take a battery of other examinations.

At the completion of their course work all except six were required to pass comprehensive examinations which tested their knowledge in their specialty and related areas. All but four were required to demonstrate their ability to design, execute and defend their proposed or completed research. Generally, oral examinations were supervised by an examining committee but in some cases the candidate was evaluated on the basis of a seminar which he presented before the graduate faculty and the students in his field.

Course examinations were rarely taken by the subjects. In lieu of these, comprehensive papers covering the research on a particular problem were used as the basis for evaluation.

Course Requirements

Basically, the program of graduate study which the subjects pursued included a series of courses in the specialty, one or more statistics courses and a minimum selection of courses in a related area or areas. In almost all cases the scholars reported that, in general, they had taken a bare minimum of formal course work.

In evaluating their formal courses, 60 per cent of the subjects ranked their courses in statistics and design as the most helpful in their training programs. However, about 20 per cent said that they learned statistics more meaningfully when they studied it informally or outside of the course in relation to their on-going research. Two scholars found these courses of no value to their particular research and several others criticized their programs for over-emphasizing statistical techniques at the expense of others. Five of the subjects had had no course work in this area.

Statistics Course Work

There was great variability in the number and types of statistics courses taken by the subjects and great variability in their mathematical preparedness for them. Table 56 shows the differences in the subjects' undergraduate work in mathematics.

TABLE 56

UNDERGRADUATE MATH PREPARATION OF THE SUBJECTS

Number of Math Courses	Number of Respondents
None	6
One	3
Two	7
Three	2
Four or more	12
No answer	1

In addition to the regular statistics department, statistics courses were taken in a variety of different academic departments including education, psychology, economics, mathematics, public health and sociology.

Table 57 demonstrates the types of statistics courses taken by the subjects and the number who took each type.

About a third of the subjects had had two or more statistics courses, a third had only one course and the remainder had had none. Several noted that they took additional courses in statistics after completing their degrees; one had taken a post-doctoral program in statistics. About two-thirds of the respondents said that they would have taken more work in this area had it been available to them during their studies.

TABLE 57

FORMAL TRAINING IN STATISTICS: TYPES OF COURSES

Type of Course or Training	N	%
None	5	16.1
Elementary statistics	19	61.3
Analysis of variance	15	48.4
Multiple Correlation & Regression	17	55.0
Factor analysis	11	35.4
Non-parametric techniques	3	9.6
Survey sampling	3	9.6
Biostatistics	3	9.6
Other:		
Mental test theory	1	3.2
Scaling techniques	1	3.2
Hypothesis testing	1	3.2
Probability	1	3.2
Documentary research statistics	1	3.2
Math-statistics	2	6.4
Physics and mathematical statistics	1	3.2

The major complaint about their statistical training centered around two points (1) it was often taught without any reference to application and (2) the emphasis on "results" of computation drove out thinking about the data and its implications.

A third of the subjects had had experience and some instruction in coding and processing data before they began their dissertation research and the same number had completed pilot studies. None of the subjects had had instruction in programming although one had experience in this area. The recency of the development of computer techniques obviously accounts for these data. Many subjects now advise their students to get experience of this kind.

Other Methods Courses

General courses in research methods were rarely taken and when taken rarely helpful according to the subjects in the study. However, a long list of specific methods courses were mentioned as being highly relevant and useful. Many of these involved special or experimental techniques and some involved a combination of methods in related fields. Due to the wide diversity and high specificity of the subjects' interests no meaningful interpretation could be made of the general utility of these courses to students in Education. Nevertheless, they revealed the wide spectrum of methodological courses available at this level and underscored the feasibility of designing unique training programs based on interest, goals and potential rather than on a set of prescribed courses required for all students.

There was general agreement among the scholars that the study of research methodology was an essential part of every graduate course and that it was fatuous to presume that its content could be covered in a general course. They suggested that students be trained in the analysis, critique and design of research as an integral part of their content courses, seminars discussions and research papers. They also suggested that graduate students be given a holistic view of the projects on which they were assisting. Specifically, they saw a need for involving students actively at the planning stage, if feasible. If not, they should participate passively as critical observers to gain a total rather than a piecemeal perspective.

Sessions in which members of the research staff or visiting scholars discussed the rationale and the strengths and weaknesses in their own research was cited as excellent opportunities for teaching and learning about design and methodology.

Most of the scholars reported that they had learned the methods that they knew independently of any course. In this sense, thev typify the third group in Thelin's classification of learners whom he described as (1) those who learn most in lectures and courses (2) those who learn through the dynamics of discussion and (3) those who prefer to go it on their own.

Although nearly 10 per cent of the respondents thought that students needed a basic knowledge in the tools and techniques of research before participating in on-going projects, 90 per cent agreed that immersion in research should start early, if not immediately, on entrance into graduate study. Many in the latter group thought that by encouraging early involvement in research the student's interests and motivation were allowed to develop rather than held in suspension. Others reasoned that the interest generated in the master's program often lost momentum if continuity with research was broken. Still others believed that the tools and techniques of research were learned more meaningfully when they were studied in the context of an actual research problem, hence, they questioned the value of methods courses that were taught in the abstract.

Comparison Between the Quality of Research Courses in Education and Courses in Other Departments

When those subjects who had taken research courses in education were asked to compare their quality with research courses they had taken in other departments the results shown in Table 58 were obtained.

TABLE 58

COMPARISON OF THE QUALITY OF RESEARCH COURSES
TAKEN IN EDUCATION WITH THOSE TAKEN IN OTHER DEPARTMENTS

Courses in Education were better	12.5%
Courses in other departments were better	25.0%
Courses in Education were equal in quality to those in other departments	62.5%

Apparently, there is little support for the often cited claim that the quality of courses in education is inferior to those in other departments, at least as far as the institutions represented in this study are concerned.

Training in Verbal Experiences

While active participation in on-going research was rated as "the most valuable experience" in their doctoral programs, participation in research colloquia, symposia, panels and seminars were also described as very valuable learning situations. About 50 per cent of the subjects noted that they found the experience gained in presenting their dissertation proposals (or findings) to a seminar particularly helpful. The frequency with which these verbal experiences were mentioned in the questionnaire responses, and supported in the interview data, suggests that experiences of this nature had both training and psychological value for the subjects. Many implied that in the synthesis and distillation of their research plans they had found great value in "talking out" their ideas and getting feedback from their professors and peers. The refinements that often can be lost in written communication were, for some, more sharply delineated in face-to-face discussion of their research ideas.

The Foreign Language Requirement as an Aid to Research

The foreign language requirement for doctoral students in education has been questioned for its effectiveness as a scholarly activity, a research tool, a means of expanding one's knowledge in education or as an opportunity for exposure to other cultures. The data from this study appear to substantiate these doubts and to underscore the need for a reexamination of the rationale for this requirement.

If the case is posited that knowledge of a foreign language is a useful research tool, the data from this study show that that knowledge and utility appeared to serve only an immediate end for most of our subjects; namely, the fulfillment of a graduate program requirement.

Of the 26 persons who were required to pass a German language examination, only three said that they found it "particularly useful" in their research activities. (All three of these had studied in a German University). Four others found German "moderately useful" but the remainder (74 per cent) reported that they had not found it useful. Eight subjects said that they currently read German but three said they did so with "difficulty" or "with the use of a dictionary". Table 59 shows the distribution of the data on this item in the questionnaire.

TABLE 59

FOREIGN LANGUAGES REQUIRED FOR GRADUATE STUDY: USEFULNESS TO RESEARCH

Required Language	N=31	Particularly Useful	Moderately Useful	Not Particularly Useful
German	26	3	4	18
Spanish	1		1	
French	29	3	9	16
Russian	1		1	
None	1			

Knowledge of French appeared to be slightly more utilitarian as a research tool than did German. French was described by 10.3 per cent of the scholars as "particularly useful", and by 31 per cent as "moderately useful". The remainder (59 per cent) said that they had not found it useful in their careers. Although two-thirds of the respondents said that they currently read French, over one-half said that they did so "poorly", "with a dictionary" or "very little".

TABLE 60

NUMBER OF FOREIGN LANGUAGES CURRENTLY READ

None	11
One	8
Two	6
Three	3
Four	2

Apparently, many of the scholars had lost the proficiency that had enabled them to pass their language requirement. Thirty-nine per cent said that they could currently read in no foreign language. Twenty-six per cent of the remainder said that they had lost their knowledge and skill in one of the two languages in which they successfully had been examined. Only 19 per cent still read in both languages on which they had been examined. The latter included many who described their proficiency as doubtful.

Among the five subjects who currently read in three or more foreign languages were three who had been educated abroad, one who had learned his parent's native language as a child and one whose research involved the psychology of languages.

Strengths and Weaknesses in the Subjects' Doctoral Training

Fifty-five statements were used by the subjects to compare the strengths of their doctoral programs and thirty-five to describe the weaknesses. Of the latter, 13 centered on statistics deficiencies, 6 on a lack of work outside of the department and 5 cited a lack of opportunity for pilot studies or experimentation prior to the dissertation. Seven subjects explained that the weakness they experienced was not inherent in the program but in their own decisions during this period. For example, one noted that the depression influenced him to complete his program in the minimum amount of time and to prepare himself for a variety of jobs. Thus he hedged on research. Others said that they had failed to take advantage of certain opportunities that were available. One noted that he was not ready for research until late in his program because as a school administrator he was still oriented toward the "ought" and "should" problems of keeping school. Two others implied that their early orientation had been diffuse hence their involvement in research was piece-meal instead of integrative. They suggested that this might have been remedied by more adequate advising.

About a third of the subjects reported that their programs had not placed sufficient emphasis on the relationship between scholars and the school room. They suggested a need for keeping educational research questions closer to human life and for more training in the observation of the educational process as it affects the learner.

A profile of the strengths and weaknesses in the subjects' doctoral programs appears as follows:

Strengths

The university provided an atmosphere which:
1) Placed high value on research
2) Encouraged everyone, from theorist to clinician, to do research
3) Included excellent models of scholarship
4) Provided an interdisciplinary viewpoint
5) Generated a respect for the field and for data
6) Provided freedom from a crowded or rigid curriculum
7) Tolerated different or new approaches and ideas
8) Encouraged independence
9) Encouraged a continuous engagement in research
10) Included adequate consultative opportunities
11) Provided strong preparation in the basic tools
12) Provided supervision when needed
13) Provided a first-rate auxiliary staff.

Weaknesses

The program provided insufficient:
1) Emphasis on the implementation of research techniques
2) Opportunity for experimentation
3) Preparation and training in research design.
4) Statistical preparation
5) Coursework outside the department.

The predominant strength in the doctoral training of the subjects was the vitality in the institutional climate for research. With minor exceptions this environment was descriptively painted as "challenging", "stimulating", "infectious", and "alive". Faculty and students were "involved", "au courant" and "committed" in respect to research ideas and activity. On the average, 80 per cent of the faculty were actively engaged in research. The organization of research was depicted as "free", "integrative", "cohesive" and "tolerant of divergency". By stressing the interdisciplinary aspects of the problems to be investigated, emphasis was placed on the substantive nature of the research rather than on constitutional questions concerned with the preservation of departmental boundaries. Those boundaries which did exist between related disciplines were, for the most part, "semi-permeable".

In effect, the viable programs for research training were committed to the notion that their candidates were *becoming* trained researchers rather than to the idea that acquisition of the doctorate represented a *fulfillment* of training. These programs operated on the assumption that learning would accelerate at a more rapid rate *after* graduate education than *during* it.

Freedom was an essential component of the strong programs. In these, concerted efforts were made to resist attempts to set up a procrustean bed in which all candidates were forced to fit. Although it was generally agreed that a foundation based on coursework was desireable and necessary, great flexibility was provided in the method through which the requirements were satisfied and in the selection of subsequent coursework.

Research Assistantship Experiences

Two-thirds of the respondents reported that they had held research assistantships during their doctoral programs. These varied in length of time from one-half to three-and-a-half years. The median was close to two years. The types of work required by these appointments varied greatly and included such assignments as assisting a department member on his research project, collecting and analyzing data in a research center or institute, field service and laboratory experience and work in an examiner's office. With minor exceptions these were described as valuable experiences in research training. They served to identify the student to and with the research faculty in his field and gave him a locus for interaction. Many subjects described these experiences as much more meaningful than the professional experience requirement which some institutions impose prior to admission to the doctoral program.

Three scholars said that they felt some negative reaction to their research assistantships because they had been used too long as statistical clerks or on routine tasks which did not advance their development toward independent research.

Teaching assistantships were seen as inappropriate experiences for candidates with high research potential. Some subjects suggested that if these experiences are available they should be limited to one semester to avoid distractions from and delays in the student's research goals.

Recommendations of the Subjects for Strengthening the Training for Educational Research

When the subjects were asked to suggest ways and means through which educational research training might be strengthened, their statements contained several explicit imperatives. These included, the need for (1) a more careful and systematic recruitment of high ability students who manifest a commitment to the search for new ideas (2) training programs which provide up-to-date tools, techniques and basic knowledge and resist the need for closure and (3) improvement in the image of educational research and researchers.

The Identification and Recruitment of Research Ability

In general, the subjects admitted that the means they used to identify and select doctoral candidates were often based on imprecise and disconnected data and on intuitive response rather than on scientific evidence.

An analysis of their statements on this question in the interview indicated that while they were able to describe the basic characteristics they sought in a doctoral student they were not able to explain precisely how they obtained their cognitive (or intuitive) insights about his potential.

One scholar epitomized the thoughts of the majority by his statement (paraphrased) that the method of selecting research talent is based on a recognition - usually pre-logical, intuitive and involving all of the senses - of a dimly sensed pattern or gestalt. He observed that the more one's apprehension of this pattern is free from cultural and past scientific values, the more adequate his perception is likely to be.

Essentially, all of the respondents concurred with one subject who suggested that the elements which make up the characteristic pattern of the researcher appear to be:

1) A keen and alert intelligence
2) A dedicated immersion over time in a broad range of related phenomena
3) A disciplined personal commitment to searching, to finding out
4) An openness to the field of one's study, to all avenues of knowledge, and to the experiencing of others who are involved in similar work.

The respondents were also in basic agreement that these elements need to be (1) defined operationally, (2) stated as hypotheses and (3) systematically researched.

The fact that only one subject mentioned the use of grades as a selection criterion probably signifies their non-utility for this purpose. However, another subject did note that he preferred to work with students who had "erratic grade patterns" and "looked skeptically on those who consistently pulled top grades."

Three psychologists said that they used the Graduate Record Examination to appraise their candidates but because "psychology students usually did not show up well on some qualitative scales" they depended largely on the applicant's scores on scales measuring quantitative ability. Several used cut-off points on the Miller Analogy Test and a few mentioned that they used scores of verbal ability as a screening device. However, the usefulness of standardized tests of this nature as selection devices was doubted by three of the respondents because of the low correlation they found between M.A.T. scores and faculty evaluations.

For practical purposes, most of the respondents depended upon a cluster of factors in assessing their candidates but the two principal media for identifying research-oriented students were seminar papers and observed behavior. Papers which revealed a capacity (1) to read and evaluate the literature of research clearly and insightfully (2) to develop the major problems and sub-problems in an issue (3) to raise significant new questions, and to go beyond existing methods in attempts to resolve them were seen as one index of potential ability. Some respondents said that they generally invited a student in to talk over an interesting idea he had developed in a seminar report. This conference provided an additional opportunity for assessing the student's potential and commitment to research.

In terms of observed behavior the subjects frequently mentioned that they identified research-oriented students (or students identified themselves to instructors) by the nature of the questions they raised or the quality of the reports and observations they made in seminars. Favorable appraisal was made of those who (1) picked up questions (2) reacted spontaneously (3) used an analytical style in approaching problems (4) manifested an interest and enjoyment in discovery (5) enjoyed differences of opinion and (6) were not defeated by criticism. Other personal traits that were described as desireable were (1) intense curiosity (2) drive or self-motivation (3) stick-to-it-tive-ness (4) off-beat interests (5) self-assurance and (6) initiative. Independence of spirit and the ability to follow through on original ideas were rated as highly favorable assets as was the ability to reduce a major problem to its essential elements without bein intimidated by its size.

A few required their advisees to write a paper in which they were asked to discuss (1) the nature and depth of their research interests (2) the degree and direction of their interests (3) the extent to which they had worked independently and (4) the diversity in their preparation for research.

In selecting or admitting students, some professors looked at specifics, such as the strength in a candidate's math background, but in general, they were in agreement that doctoral candidates should have a liberal arts background, a minimum of undergraduate coursework in the specialty to be pursued, and if he holds a M.A. degree it should be from a research-oriented university.

Some concern was expressed about drawing out the student who appears shy and non-aggressive but is, in reality, a good thinker. The technique which some subjects used to expose the latent possibilities in these students was to invite them in for an informal discussion or to give them a research responsibility which would illuminate their research potential and encourage them to become more verbal.

One subject said that he identified promising students by periodically announcing through a notice on the bulletin board that he was interested in examining the research in a given area and in talking with students who shared this interest. After a conference with those who responded, 8 or 10 students were selected who then worked together on a common problem for several weeks. Following this period, each one selected a particular area on which to work independently. Professor and students alike wrote papers which were criticized in group meetings. According to the respondent, those who had a genuine ability and interest in research generally stood out or "emerged" from this experience.

The Student's Commitment to Scholarship

In evaluating current practices among schools of education the subjects were outspokenly critical of those institutions which admit large numbers of part-time students into their doctoral program. In their judgment, this practice has weakened the substance and status of the degree in education by attracting individuals who want the degree but are unwilling to make the commitment to scholarship as a style of life or a continuous quest.

By scheduling classes after the normal work day hours and reducing residence requirements to a bare minimum learning for these students becomes spatially drawn-out and attenuated by their inability to reflect on, synthesize, integrate, or experiment with the significant problems in the field in company with other students and scholars. According to the respondents, most part-time students fail to perceive Education as a unified field of study because of the piecemeal nature of their progress in the program. Some scholars stated that the concessions shown to part-time students militate against the progress of the individual who has committed himself to a full-time program because the latter must adjust to the tired pace of the student who comes to class after a full day of work outside.

The scholars were unanimous in their belief that more stipends are needed in education to correct this picture. About two-thirds said that they would like to see many small grants made available to students as "seed money" for their research. Others favored support of the student for 2 or 3 years and still others favored a combination of outright grants to the student plus compensation for his service to the institution. Twelve suggested that post-doctoral fellowships would probably provide the greatest incentive toward a continual commitment to research because they would free the researcher from teaching, administrative and other non-research obligations.

The Nature and Content of Research Training

In reflecting on the nature and content of the improvement needed in educational research training, the subjects noted that knowledge in all fields is on a course of accelerating acceleration thus the onus lies on the graduate faculty to provide experience and basic knowledge in the discipline but, more significantly, to instill in the student the conviction that unless he learns how to continue to learn throughout life his education will be obsolete within 5 or 10 years.

The respondents were in almost unanimous agreement that schools of education could more effectively utilize the contributions of the social sciences in their research training programs than they currently do. There was also common agreement that in view of the complexity, magnitude and interrelatedness of modern educational needs, the existence of barriers between these disciplines is untenable. They described as anachronistic those researchers who isolated themselves professionally and they insisted that the investigation of the nation's current educational problems requires a level and breadth of sophistication rarely, if ever, found in a single scholar, discipline or methodology.

In general, they suggested the following ideas for bridging the gap between education and the social sciences: the school of education might:

(1) Build an interdisciplinary graduate faculty in education by adding scholars to the staff whose basic competencies lie in anthropology, sociology, psychology, political science and/or economics

or:

(2) Encourage a wedding of the related disciplines through meaningful joint appointments in education and one of the above mentioned fields.

(3) Recruit students who had their undergraduate work in the liberal arts rather than in education. (Rationale: the latter tend to be professionally oriented and concerned with different kinds of questions than researchers ask).

(4) Require education students to take courses in the behavioral sciences or offer cross-listed courses with those science and humanities departments whose staff and students are interested in educational problems.

(5) Train for interdisciplinary competencies through task-oriented team activities.

(6) Arrange research assistantships or apprenticeships in the behavioral science departments for doctoral candidates in education and vice versa.

(7) Conduct interdisciplinary colloquia, seminars and conferences in which the basic problems in educational research are examined and discussed.

(8) Hold joint workshops with the behavioral or social science disciplines that are concerned with common problems of philosophy, methodology, design, analysis, etc.

(9) Plan a "boot strap operation" in which scholars in education and scholars in the social sciences get together to select the cohesive principles, methods and technique in their respective fields and set them out in a reasonably tractable form that would be helpful to all who work on educational problems.

In view of the scope of current research projects, the trend toward systems analysis and the development of computers and other automated devices, some scholars foresaw a need for educational research training on a variety of levels,e.g. the levels of (1) creative speculation (2) problem solving and (3) research technology. In lieu of this as an immediate prospect, the subjects advocated a research training program which prepared the graduate for excellence in a limited area and for proficiency in a number of related areas. In the judgment of the subjects this is best achieved when the principles of interdependency and interrelatedness are recognized and respected among scholars who work on common problems. One subject observed that too often research is poorly done - or left undone - because some educators are still reluctant to ask the statistician for assistance least this be interpreted as an admission of incompetency in research.

The Image of Educational Research and Researchers

A fourth of the subjects were critical of the defensive and negative attitudes which some educators exhibited toward their field of study; toward certain degree programs in education or toward the leadership in this area. Several psychologists noted that this self-deprecating attitude has the net effect of a self-fulfilling prophecy in which the school of education in some institutions is assigned to the tail end of the university pecking order. They cautioned that this "social set" is not lost on the student some of the best of whom transfer to disciplines that mount their programs with more confidence.

In the judgment of at least half of the respondents there is a pressing need for the school of education to communicate and inculcate a positive image of its role, to emphasize the creative aspects of Education rather than the "duties of educators" and to be philosophically committed to the proposition that the quality of the nation's future depends upon the quality of its education. A majority of the respondents thought that the problem of status could be largely resolved by a better quality of younger, full-time students and by a faculty competent in research and less involved with the problems of professional training.

Several subjects believed that the problem of status was probably the greatest barrier to the implementation of an interdisciplinary approach to educational research training. Not withstanding the fact that their research centered on educational problems, two of the subjects voiced this predicament when they said that they were reluctant to affiliate with the department of education for status reasons. On the other hand, 29 per cent of the subjects held joint appointments in education and 48 per cent had transferred their fields or combined with an academic field other than the one in which they had earned their research degree.

TABLE 61

CHANGES IN ACADEMIC AFFILIATION AMONG THE SUBJECTS

From Department of	To Department of	N
Education	Psychology	2
Psychology	Education	7
Sociology	Education	1
Social Relations	Psychology	1
Psychology	Social Psychology	1
Sociology	Political Sociology	1
Public Administration	Psychology	1
Science	Education	1
Science	Psychology	1
No change		15
Joint appointments in Education/Special Field		9

Some scholars were pleased to notice openings beginning to appear in the walls between related disciplines. For example, a sociologist noted that scholars in his discipline had only lately come to realize the import in Dewey's contention that education provides an institution for change. Having now accepted this idea, they found it a fertile field for studying bureaucracy, organization, internal conflict and a whole gamut of social problems including integration, social stratification, community relations and comparative studies.

Some psychologists in the group made similar observations. They noted that when psychological studies are, in effect, "moved out of the 'frozen' laboratory structure and into the wing of a high school" the genesis and process of many problems (such as the school drop-out) can be studied more realistically. These moves served the additional function of bringing educators and other social scientists into cooperative association.

The educators in the group reported that their fundamental purpose in exposing students to other disciplines was to prepare them to evaluate divergent and conflicting views. Hopefully, such exposure would enable the student to use a wider canvas in designing his own research and a broader lens in understanding the basic facets of educational problems. At least half of the subjects implied that contacts with many minds gave their doctoral students a better chance, in the evolution of their own research viewpoints to avoid the tendency "to become pale images of their mentors." As an additional safeguard against narrowness of viewpoint some subjects recommended that doctoral students be sponsored by committees rather than by individuals. Others recommended that the candidate be guided under joint sponsorship made up of one faculty member in education and one in the discipline most appropriately related to the student's research.

Some of the innovations recommended by the scholars in this study involved reorganizations in the traditional structure of schools of education. Eight scholars suggested, for example, that training for educational research should be removed from the professional school, placed under an interdisciplinary umbrella and operated as an autonomous unit of the Graduate Division. Three others suggested that educational research training (and the image of educational research) could be appreciably strengthened by the establishment of a few outstanding Institutes of Advanced Study in Education. One respondent recommended that such an institute might be in a better position to develop innovatively if it were organized on a new campus or on a campus which currently has a strong social science staff but no existing school of education.

In general, the scholars in this study were in full agreement with Berelson's point that our system of graduate education has more leeway for innovation than its defenders typically believe. They further agreed that the time is auspicious for innovation.

Summary

In an attempt to gain insight into those factors which appear to influence (or to converge in) the development of research scholarship, a study was made of the background and training, the personal characteristics and the research productivity of thirty-one outstanding scholars in Education and related fields. An assessment was also made of the climate for research and the resources of the institutions in which the subjects were trained and in which they are now working.

Findings

In terms of their academic backgrounds the scholars in this study tended:

1. To be graduates of liberal arts undergraduate programs
2. To have attended one or more private institutions of higher education
3. To have earned degrees in two or more fields of study
4. To hold doctoral degrees from Columbia, Harvard, Chicago, Minnesota, California or Ohio State Universities
5. To have selected their graduate schools on the basis of its reputation for scholarly research and its outstanding research faculty
6. To have attended graduate school on a continuous full-time basis
7. To have completed the doctoral degree before age 30
8. To have published research before (or within one year of) completion of the Ph.D. requirements and consistently thereafter
9. To be somewhat alike on personality scales measuring theoretical orientation, ability to deal with complex ideas and autonomy but more broadly varied on scales measuring thinking introversion and estheticism.

In terms of institutional characteristics the graduate institutions attended by the subjects provided:

1. A strong research climate
2. Graduate courses which emphasized (1) the analysis and criticism of theories, (2) methodology rather than conclusions, (3) basic and difficult questions rather than simple answers and neat procedures
3. A *minimum* of course requirements and a *maximum of independent* study
4. A close, coherent involvement with outstanding, creative research professors
5. Early immersion in *active* research projects
6. Freedom and independence to probe heuristically
7. Formal and informal contacts with scholars from a variety of disciplines
8. Propinquity of research staff and facilities
9. Fairly adequate physical facilities for research
10. Insufficient financial support for graduate students
11. Insufficient training in research design
12. Little opportunity for courses out of the department
13. Insufficient "seed money" for research experimentation and pilot studies
14. Broad flexibility in program offerings.

CHAPTER VI

CONCLUDING STATEMENT

When a decision is made certain consequences follow. If decisions are to be intelligent ones, some degree of fore-knowledge of consequences is necessary. Research does not determine decisions; rather, it provides the fore-knowledge on which decisions may be based. Decisions are made in response to wants, purposes, and costs. Even large issues of war and peace need knowledge of costs (personal, economic, political) to guide policy decisions. The acceptance of costs in making a decision is not determined by research. If one wants something very much, very high costs may be acceptable, but one should know the cost. Research provides the knowledge. Education needs a much greater foundation of knowledge than is now available and on a much broader range than presently exists.

The study reported in the preceding pages of this report provides some new knowledge related to training for educational research. For example, Chapter V provided useful information regarding the education, personality characteristics, and the working climate of outstanding producers of educational research. Chapter II contained information regarding a large group of doctors showing differences for a list of variables between those who were and those who were not productive in research during the ten year period following their doctor's degree. Chapter III provided a body of comparative data showing the extent of change over a ten year period on the variables reported for those who received their degrees in the years 1954 and 1964. Chapter IV reported the character of work which is presently being done for the doctoral dissertation in schools of education. All of these data are pertinent for decisions regarding desirable training for educational research. If no decisions are made and things are left as they are, the outlook for the next ten years gives no promise of being different from the last ten. What one may expect is a few bright spots in half a dozen or so of the most energetic schools of education but a generally static condition in the remainder. The recommendations made in Chapter I of this study represent the views of the research staff reinforced and supplemented by members of the conference of knowledgeable persons who reviewed the findings of this study and the proposed recommendations.

Research outside the field of education has shown special vigor in those situations where two or more disciplines combined their knowledge and skills for the solution of problems. Medicine and engineering have flourished through cooperation with research scientists in diverse fields related to these two areas. At a time when interdisciplinary research has proved its value in other areas, education still has shown no great progress in this type of effort. It is true that there have been some exceptions. Educational psychology is the best example of an attempt to cooperate with an outside discipline, and there are indeed some conspicuous accomplishments in departments where a sizeable portion of the faculty is made up of persons with doctoral degrees in psychology. However, when one moves away from the major universities, departments of educational psychology are most frequently staffed by persons who received their degrees in education, with a limited background in fields outside. The presence of sociologists, economists, and political scientists in faculties in schools of education is still rather exceptional. The method of joint appointments has not worked out as was expected when the plan was first tried.

The chief hope at the present time seems to be in problem-centered rather than department-centered research. Education is replete with problems in which intelligent decisions cannot be made because there are not sufficient data available on which to base them. Most of the research in education has been intra-departmental and has been carried on by individuals. This is still the case at the time when outside of education great strides are being made by inter-disciplinary teams who attack major problems with the intellectual and scholarly resources of the entire university brought to bear on the issues being studied.

The greatest hope for improvement in training for educational research is to bring to bear on the programs of graduate students all the resources that various disciplines can contribute to carrying on research. The problem is how best to do this. Some changes in organizational structures have been suggested in the recommendations in Chapter I. These are experimental and it remains to be seen what will be the best solution to the problem of securing wider training for persons who do research on educational problems. It is suggested that new plans be tried both within the structure of present schools of education and also in inter-disciplinary institutes organized independently of schools of education and responsible directly to the dean of the graduate school. In the latter case, it is hoped that the ingenuity and freedom of operation of an inter-disciplinary faculty group might devise better training programs than have hitherto been available.

Although no attempt in this report should be made to prejudge the specific details of new training programs, it should be emphasized that intelligent decisions must rest on available knowledge relating to the problem. This study has added to and affirmed existing knowledge relating to research training. Some of the evidence relating to research training is so clear that it can no longer be ignored. For example, evidence is replete to support the recruiting of graduate students for research training who are under thirty years of age, yet at present doctors in the field of education are older than in any other department in the university. Evidence indicates that more research is published by persons who have had little rather than large amounts of pre-professional experience. Yet again, education is the worst offender by far in academic groups. The differences here are not small; they are excessively large. Evidence indicates that continuous full-time residence is highly important for training in research and yet once more the pattern for education is part-time residence spread over a long period of years with class schedules too often favoring the convenience of part-time students. There is evidence both in this and in other studies that participation in research while a graduate student is one of the best kinds of training. Yet, in education, the number who have such opportunities is small and it has not increased in the last decade. Education still relies heavily on taking courses as preparation for doing research. In view of the fact that in these and other factors the evidence seems to be clear as to the direction that research training should take, why has there been so little movement in these directions in the decade just passed?

The reasons for lack of progress in training for research are complex and improvement will not come quickly or easily. One of the difficulties seems to be lack of a clear objective as to what graduate programs in education should accomplish. In part this is inherent in the nature of the field. Education has an obligation to extend knowledge through research, but it also has an obligation to train teachers and administrators and to provide services for the field outside the university. The fact that some universities offer both the Ph.D. and the Ed.D., while others offer only one degree seems to make little difference since in many cases one cannot distinguish from the program carried which degree is to be the outcome. Nor in the research published following the degree is the difference clear. More research is done by Ph.D.'s than by Ed.D.'s, but some who hold the Ed.D. degree do more research than many who hold the Ph.D.. In most cases graduate programs try to cover both objectives at once and the result is mediocrity. The implication of this study is that there should be a sharper distinction between training for research and training for professional competence. Nothing is gained from trying to rate one objective above the other. Both types of training are important and both are necessary.

The authors of this study believe that there is no brighter field for research than is offered in education. Not only in this country but throughout the world the most crucial problems seem to call for educational solutions. Hitherto research in education has for the most part dealt with intra-school problems, matters of administration, counseling, and learning, but limited mainly to practices within the school system. This limited attack on research problems, admittedly important in its own area, has been woefully inadequate. Education impinges so broadly on society that the solution of its problems requires the services of competent persons, trained in other ways than provided in departments of education alone.

As the importance and magnitude of problems in education become widely recognized, educational research should attract the interest of the best students in universities as well as the research activity of faculty members in the social sciences. With increasing support from the federal government and wider participation of interdisciplinary teams, there is no more attractive field for graduate students than educational research now offers. Training programs must be devised to match this expanded opportunity.

Bibliography

Anderson, K. E., "Avenues for the Improvement of Research," Science Education, 45:418-24, Dec., 1961.

Ausubel, D., "The Nature of Educational Research," Educational Theory, October, 1953, 314-320.

Bantock, G. H., "Educational Research: A Criticism," Harvard Educational Review, 31:3, Summer, 1961, pp. 264-280.

Beach, L. B., "The Graduate Student," in Graduate Education Today, Walters, E. (editor), American Council on Education, Washington, D. C., 1965, pp. 118-128.

Beaton, A. E., "University Data Processing Centers," Harvard Educational Review, 31:3, Summer, 1961, pp. 244-249.

Berelson, B., Graduate Education in the United States. New York, McGraw-Hill, 1960.

Biel, W. D., "Assessment of Creativity in a Research Setting," Journal Applied Psychology, 45, Dec., 1961, pp. 353-358.

Brown, L. D. and M. Slater (editors), The Doctorate in Education, Volume I, "The Graduates," Washington, American Association of Colleges for Teacher Education, 1960.

Brownell, W. A., "The Preparation of Research Workers in Education," American Educational Research Association Newsletter, Symposium Proceedings 8, 1957, pp. 7-8.

______________, "Educational Research in a Decade Ahead," California Journal Educational Research, 14:3, 1963, pp. 51-66.

Buswell, G., "Research and the Degree Doctor of Philosophy in Education," Journal Educational Research, Feb., 1931, pp. 146-152.

Campbell, R. F., "Training Research Professors of Educational Administration," Educational Research: New Perspectives, Culbertson, J. and Hencley, S. (editors), Danville, Illinois, Interstate Printers and Publishers, 1963.

Cattell, R. B. and Drevdahl, "Personality Profiles of Eminent Researchers," British Journal of Psychology, 46, Nov., 1955, pp. 248-261.

Charters, W. W., Jr. and N. L. Gage, Readings in the Social Psychology of Education. Boston: Allyn and Bacon, Inc., 1963.

Clark, K. E., America's Psychologists. American Psychological Association, Washington, D. C., 1957.

Clark, T. L., "Educational Research: A National Perspective," Educational Research: New Perspectives, Culbertson, J. and Hencley, S. (editors), Danville, Illinois, Interstate Printers and Publishers, 1963, Chapter 1, pp. 7-18.

Clausen, J. A., "Research Development: A Problem of Leadership," in Educational Research: New Perspectives, Culbertson, J. and Hencley, S. (editors), Danville, Illinois, Interstate Printers and Publishers, 1963.

Clymer, T., "Some Current Needs in Educational Research," Phi Delta Kappan, 40:253-57, March, 1959.

Coladarci, Arthur P., "Toward More Rigorous Educational Research," Harvard Educational Review, Winter, 1960, pp. 3-11.

Conrad, H. S., "Research in Education: Direction and Misdirection," *Teachers College Record*, 64, Oct., 1962, pp. 13-19.

Cooley, W. W., "Research Methodology and Modern Data Processing," *Harvard Educational Review*, 31:3, Summer, 1961, pp. 257-263.

Coombs, P., "Imperative Problems in Educational Research," *New York State Convocation on Educational Research*. Albany, New York, Nov., 14-15, 1960.

Dodds, H. W., "Project Research," *American Scientist*, 42:129, 1954.

Dvorak, E. A., "Research Requirement for the Doctorate," *School and Society*, 80, Nov., 13, 1954, pp. 151-152.

Fattu, N., "Survey of Educational Research at Selected Universities," Phi Delta Kappan Symposium, *Educational Research*, Banghart, F. N. (editor), Bloomington, Indiana, 1960, pp. 1-21.

Flanagan, J. C., "Data Processing in Large Scale Research Projects," *Harvard Educational Review*, 31:3, Summer, 1961, pp. 250-256.

Gardner, E. F., *Tomorrow's Graduate School*, Syracuse University Press, Syracuse, New York, 1958.

Goethals, G. W., "Framework for Educational Research," *Harvard Educational Review*, 28:1, Winter, 1958, pp. 29-43.

Good, C. V., "Resources for Educational Research," *Phi Delta Kappan*, 35, Oct., 1953, pp. 49-52.

Gottlieb, D., "Processes of Socialization in American Graduate Schools," 1960, Dept. of Sociology, University of California, Unpublished Ph.D. dissertation.

______________, "Teachers and Researchers in American Universities," *Journal Higher Education*, 32:45, Nov., 1961, pp. 2-4.

Griffith, D. E., "Some Assumptions Underlying the Use of Models in Research," *Educational Research: New Perspectives*, Culbertson, J. and Hencley, S. (editors), Danville, Illinois, Interstate Printers and Publishers, 1963, Chapter 6, pp. 121-140.

Hall, R. M., "A Platform for Educational Research," *Proceedings of the New York State Convocation on Research in Education*, Albany, New York, Nov. 14-15, 1960, pp. 11-19.

Halpin, A. W., "A Rationale for Training Research Workers," *Educational Research: New Perspectives*, Culbertson, J. and Hencley S. (editors), Danville, Illinois, Interstate Printers and Publishers, 1963, Chapter 19, pp. 311 & 324.

Heiss, A. M., "Berkeley Doctoral Students Appraise Their Academic Programs." Center for the Study of Higher Education, Berkeley, University of California, 1964.

Heist, P. and H. Webster, *Instruments for Measuring Personality Characteristics* (Study of Select Institutions), Center for the Study of Higher Education, Berkeley, University of California, 1958.

Herrick, U. E., "Guides for Facilitating Research in Universities," *Educational Research: New Perspectives*, Culbertson, J. and Hencley, S. (editors), Danville, Illinois, Interstate Printers and Publishers, 1963, Chapter 5, pp. 59-85.

Hilgard, E. R. and H. G. Richey, (editors) *Theories of Learning and Instruction*, Sixty-third Yearbook, Part I, of the National Society for the Study of Education, Chicago, University of Chicago Press, 1964.

Jensen, A., "Improvement of Educational Research," Teachers College Record, 64, Oct., 1962, pp. 20-27.

Kerlinger, I. L., "Practicability and Educational Research," School Review, 67:3, Autumn, 1959, pp. 281-91.

______________, "Function of the University Professor in Education," School and Society, 85, February 2, 1957, pp. 35-37.

______________, "Scholarship and Research," Educational Forum, 19:March, 1955, pp. 271-4.

______________, "Mythology of Educational Research: The Methods Approach," School and Society, 88, March 26, 1960, pp. 149-151.

Kidd, J. W., "Check-list for Doctoral Research," Journal Educational Research, 47, March, 1944, pp. 555-557.

Knapp, R. and L. Ehlinger, "A Factor Analysis of Fields of Scholarly Production," Journal of Educational Research, Volume 56:9, May-June, 1963, pp. 484-487.

Lamke, T. A., "Prevalence and Content of Graduate Courses in the Methodology of Educational Research," Journal of Educational Research, 49, October, 1955, pp. 103-111.

Lazarsfeld, P. and S. Sieber, Organizing Educational Research. Prentice, New York, 1964.

Long, J. A., "Role of Research in Education," Educational Digest, Summer, 1954, pp. 20-25.

MacKinnon, D. W., "The Nature and Nurture of Creative Talent," American Psychologist, 17: 484-495, July, 1962.

McConnell, T. R., "The Nature of Educational Research," Educational Record, 22: 575-595, October, 1941.

______________, "Approaches to the Measurement of Intellectual Disposition," Proceedings of the 1962 Invitational Conference on Testing Problems. Princeton, New Jersey, Educational Testing Service, 1963, pp. 74-88.

Mooney, R., "The Researcher Himself," Association of Supervisors Curriculum Development Yearbook, 1957, pp. 154-186.

______________, "Evaluating Graduate Education," Harvard Educational Review, 25:2, Spring, 1955, pp. 85-94.

______________, "Training in Research in Educational Administration," Educational Research: New Perspectives, Culbertson, J. and Hencley, S. (editors), Danville Illinois, Interstate Printers and Publishers, 1963, Chapter 20, pp. 325-340.

Panel on Research and Development of the President's Science Advisory Committee, Innovation and Experiment in Education. Washington, D. C.: Superintendent of Documents, U. S. Government Printing Office, March 1964, pp. 47-55.

Prior, Moody, "The Doctor of Philosophy Today," Graduate Education Today, Walters, E. (editor), American Council on Education, Washington, D. C.,1965, pp. 30-61.

Roe, A., The Making of a Scientist, New York, Dodd Mead, 1953.

Ryans, D. G., "Looking to the Future in Education," Educational Record, October, 1963, pp. 360-368.

__________, "Preparation of Educational Research Workers," Journal Educational Research, 49, 195-202, November, 1955.

Sanford, N., "Personality Development During College Years," Journal Social Issues, 1956a, 12, pp. 3-70.

Shumsky, A., "The Subjective Experience of the Researcher," Journal Educational Sociology, Nov., 1962.

Smith, G. A., "A Critique of Proposals Submitted to the Cooperative Research Branch Program," Educational Research: New Perspectives, Culbertson, J. and Hencley, S. (editors), Danville, Illinois, Interstate Printers and Publishers, 1963, Chapter 17, pp. 277-286.

Stogdill, R. M., "Role Perception and Fulfillment in Research," Educational Research: New Perspectives, Culbertson, J. and Hencley, S. (editors), Danville, Illinois, Interstate Printers and Publishers, 1963, Chapter 6, pp. 93-99.

Strauss, A., "On Research Ability in Graduate Students," Journal Higher Education, 32:8, Nov., 1961, pp. 443-448.

Symonds, P. M., "The Organization of Educational Research in the United States," Harvard Educational Review, 1957, 27:3, pp. 159-167.

Walker, H. M., "Preparation of Research Workers in Education," Elementary School Journal, 58, Oct., 1957, pp. 9-15.

Walters, Everett (editor), Graduate Education Today. American Council on Education, Washington, D. C., 1965.

Weaver, J. C., "Federal Aid to Research and Graduate Education," Journal Higher Education, March, 1959, 30:3, pp. 146-154.

Weir, E. C., "Values of the Researcher," Clearing House, 37, February, 1963, p. 359.

Weir, W. D., "Research and the Talented," The Superior Student, 5, pp. 7-8, January, 1963.

Yauch, W. A., (editor), The Doctorate in Education. Volume 3, "Conference Report," Washington American Association of Colleges for Teacher Education, 1961.

Young, R. J., "Educational Research in Colleges and Universities," Journal Higher Education, 29, 331-335, June, 1958.

APPENDIX

TABLE A1 - THE SAMPLE GROUP FOR THE 1954 STUDY*

(LIST OF 103 INSTITUTIONS GRANTING DOCTORAL DEGREES IN EDUCATION--1954 AND/OR 1964)

Names	1	2	3	4	5	6	7	8	9	10
1. Auburn U.	0	0	0	0	0	0	0	0	0	0
2. U. Alabama	0	0	0	0	0	0	0	0	0	0
3. Arizona State	1	0	0	0	1	0	1	1	0	1
4. U. Arizona	1	0	0	0	1	0	1	1	1	0
5. Arkansas	8	0	0	0	8	0	8	8	0	8
6. Claremont	1	0	0	0	1	0	1	0	0	0
7. Stanford	47	2	3	0	42	1	41	34	0	34
8. U. Cal. (Berk.)	35	1	0	0	34	3	31	23	11	12
9. U. Cal. (L.A.)	16	0	0	0	16	2	14	10	0	10
10. U. Pacific	1	0	0	0	1	0	1	1	0	1
11. U. So. Cal.	33	0	0	0	33	7	26	19	4	15
12. Colo. State	19	0	0	0	19	2	17	14	0	14
13. U. Denver	22	0	0	1	21	0	21	16	5	11
14. U. Colo.	21	0	0	0	21	17	4	4	1	3
15. U. Conn.	3	0	0	0	3	2	1	0	0	0
16. Yale	10	0	0	0	10	0	10	8	8	0
17. American U.	0	0	0	0	0	0	0	0	0	0
18. Cath. U. Am.	7	0	0	0	7	7	0	0	0	0
19. Geo. Wash.	9	0	0	0	9	0	9	3	1	2
20. Fla. State	1	0	0	0	1	1	0	0	0	0
21. U. Florida	21	1	0	0	20	1	19	14	0	14
22. U. Miami	0	0	0	0	0	0	0	0	0	0
23. U. Georgia	0	0	0	0	0	0	0	0	0	0
24. U. Idaho	0	0	0	0	0	0	0	0	0	0
25. Bradley U.	8	0	0	0	8	2	6	3	0	3
26. Loyola U.	2	0	0	0	2	1	1	1	0	1
27. Northwestern	11	0	0	0	11	0	11	7	4	3
28. So. Ill. U.	0	0	0	0	0	0	0	0	0	0
29. U. Chicago	17	1	0	0	16	0	16	15	15	0
30. U. Illinois	36	3	1	0	32	10	22	21	7	14
31. Notre Dame	1	0	0	0	1	0	1	1	1	0
32. Purdue	1	0	0	0	1	0	1	1	1	0
33. U. Indiana	40	4	1	0	35	8	27	24	0	24
34. U. Iowa	20	1	1	0	18	0	18	16	16	0
35. Iowa State U.	1	1	0	0	0	0	0	0	0	0
36. U. Kansas	16	0	0	0	16	2	14	11	3	8
37. U. Kentucky	4	0	0	0	4	0	4	4	0	4
38. U. Louisiana	11	1	0	0	10	4	6	5	5	0
39. John Hopkins	0	0	0	0	0	0	0	0	0	0
40. U. Maryland	8	2	0	0	6	0	6	4	0	4
41. Boston Coll.	0	0	0	0	0	0	0	0	0	0
42. Boston U.	---	---	---	---	---	---	---	---	---	---
43. Harvard	30	2	1	0	27	2	25	16	0	16

*Key:

1. Total number cases on lists from institutions
2. Number with addresses outside United States
3. Number deceased
4. Number listed in wrong year or not in Education
5. Number valid cases remaining (Col. 1 minus 2+3+4)
6. Number for whom no correct address was available
7. Number to whom questionnaires were mailed (Col. 5 minus 6)
8. Number of questionnaires received (filled out)
9. Number of Ph.D.'s
10. Number of Ed.D.'s

THE SAMPLE GROUP FOR 1954 STUDY (Continued)

Name	1	2	3	4	5	6	7	8	9	10
44. Mich. State	13	1	0	0	12	0	12	11	4	7
45. U. Michigan	34	4	0	0	30	0	30	26	24	2
46. Wayne State	11	0	1	0	10	3	7	4	0	4
47. U. Minn.	32	2	0	0	30	0	30	22	22	0
48. U. Miss.	6	0	0	0	6	0	6	6	0	6
49. St. Louis U.	3	0	0	0	3	0	3	1	1	0
50. U. Missouri	30	0	1	0	29	1	28	24	0	24
51. U. Mo. K.C.	0	0	0	0	0	0	0	0	0	0
52. Wash. U.	7	0	0	0	7	2	5	4	1	3
53. Mont. State Coll.	0	0	0	0	0	0	0	0	0	0
54. Mont. State U.	0	0	0	0	0	0	0	0	0	0
55. U. Nebraska	2	0	0	0	2	0	2	2	0	2
56. Rutgers U.	12	0	1	0	11	1	10	8	0	8
57. U. N. Mex.	0	0	0	0	0	0	0	0	0	0
58. Columbia	285	31	5	3	246	56	190	120	16	104
59. Cornell	20	1	0	0	19	0	19	15	14	1
60. Fordham	10	2	0	0	8	3	5	3	3	0
61. N. Y. U.	185	3	1	10	171	57	114	66	41	25
62. Rochester	0	0	0	0	0	0	0	0	0	0
63. St. Johns	2	0	0	0	2	0	2	1	1	0
64. Syracuse	8	0	0	0	8	2	6	2	1	1
65. Buffalo	24	1	0	0	23	4	19	17	0	17
66. Yeshiva	2	0	0	0	2	0	2	1	1	0
67. Duke	3	0	0	0	3	0	3	2	0	2
68. U. N. Carolina	12	0	1	0	11	0	11	9	9	0
69. U. N. Dakota	7	0	0	1	6	0	6	5	1	4
70. Ohio State	23	3	0	0	20	0	20	17	17	0
71. Ohio U.	0	0	0	0	0	0	0	0	0	0
72. Cincinnati	2	0	0	0	2	0	2	2	0	2
73. Toledo	0	0	0	0	0	0	0	0	0	0
74. Western Reserve	5	0	0	0	5	1	4	3	2	1
75. Okla. State	4	0	0	0	4	0	4	3	0	3
76. U. Okla.	10	1	1	0	8	0	8	6	0	6
77. U. Tulsa	5	0	0	0	5	0	5	5	0	5
78. Oregon State	11	0	0	0	11	2	9	6	0	6
79. U. Oregon	17	0	0	0	17	8	9	8	2	6
80. Portland	0	0	0	0	0	0	0	0	0	0
81. Dropsie	8	0	1	2	5	0	5	1	1	0
82. Penn. State	38	0	1	0	37	9	28	19	2	17
83. Temple U.	22	0	0	6	16	3	13	7	1	6
84. U. Penn.	3	0	0	1	2	0	2	2	0	2
85. U. Pittsburgh	14	0	0	1	13	3	10	8	3	5
86. U. S. Carolina	0	0	0	0	0	0	0	0	0	0
87. U. S. Dakota	0	0	0	0	0	0	0	0	0	0
88. Geo. Peabody	39	0	1	1	37	5	32	26	12	14
89. U. Tennessee	10	2	0	0	8	1	7	4	0	4
90. Baylor	0	0	0	0	0	0	0	0	0	0
91. No. Tex. State	2	0	0	0	2	0	2	1	0	1
92. Tex. Tech.	4	0	0	0	4	0	4	2	0	2
93. U. Houston	11	1	0	0	10	0	10	8	0	8
94. U. Texas	39	1	1	0	37	4	33	19	12	7
95. Brig. Young	0	0	0	0	0	0	0	0	0	0
96. U. Utah	3	0	1	0	2	1	1	0	0	0
97. Utah State	1	0	0	0	1	0	1	0	0	0
98. U. Virginia	5	1	0	0	4	0	4	1	0	1
99. Wash. State U.	3	0	0	0	3	2	1	1	0	1
100. U. Washington	6	0	1	0	5	0	5	4	0	4

THE SAMPLE GROUP FOR 1954 STUDY (Continued)

Name	1	2	3	4	5	6	7	8	9	10
101. U. W. Va.	0	0	0	0	0	0	0	0	0	0
102. Wisconsin U.	27	0	1	1	25	0	25	19	19	0
103. U. Wyoming	13	0	0	0	13	1	12	12	2	10
Totals	1495	73	25	27	1370	241	1129	818	295	523

TABLE A2 - THE SAMPLE GROUP FOR THE 1964 STUDY*

(LIST OF 103 INSTITUTIONS GRANTING DOCTORAL DEGREES IN EDUCATION--1954 AND/OR 1964)

Name	1	2	3	4	5	6	7	8	9	10
1. Auburn U.	8	0	0	0	8	0	8	5	0	5
2. U. Alabama	20	0	0	0	20	0	20	14	5	9
3. Arizona State	16	0	0	0	16	3	13	11	1	10
4. U. Arizona	6	0	0	0	6	0	6	3	2	1
5. Arkansas	22	0	0	0	22	1	21	15	0	15
6. Claremont	6	0	0	0	6	0	6	5	5	0
7. Stanford	51	3	0	0	48	2	46	37	11	26
8. U. Cal. (Berk.)	44	4	0	0	40	0	40	35	11	24
9. U. Cal. (L.A.)	53	4	0	0	49	0	49	38	0	38
10. U. Pacific	0	0	0	0	0	0	0	0	0	0
11. U. So. Cal.	62	2	0	1	59	4	55	46	4	42
12. Colo. State	82	4	0	0	78	0	78	66	1	65
13. U. Denver	21	1	0	0	20	3	17	14	1	13
14. U. Colo.	25	1	0	0	24	0	24	18	0	18
15. U. Conn.	21	0	0	0	21	1	20	17	17	0
16. Yale	0	0	0	0	0	0	0	0	0	0
17. American U.	6	1	0	0	5	0	5	5	0	5
18. Cath. U. Am.	15	2	0	0	13	0	13	9	9	0
19. Geo. Wash.	10	1	0	0	9	0	9	7	0	7
20. Fla. State	42	2	0	0	40	2	38	34	19	15
21. U. Florida	21	1	0	0	20	0	20	15	0	15
22. U. Miami	4	0	0	0	4	0	4	4	2	2
23. U. Georgia	24	0	0	0	24	1	23	19	0	19
24. U. Idaho	3	0	0	0	3	0	3	3	0	3
25. Bradley U.	0	0	0	0	0	0	0	0	0	0
26. Loyola U.	6	0	0	0	6	0	6	5	0	5
27. Northwestern	17	0	0	0	17	0	17	14	8	6
28. So. Ill. U.	13	2	0	0	11	0	11	11	11	0
29. U. Chicago	35	8	0	0	27	4	23	19	19	0
30. U. Illinois	43	6	0	1	36	1	35	29	9	20
31. Notre Dame	5	0	0	0	5	0	5	5	5	0
32. Purdue	11	0	0	0	11	0	11	8	8	0
33. U. Indiana	106	17	0	0	89	5	84	68	7	61
34. U. Iowa	35	0	0	0	35	2	33	30	30	0
35. Iowa State U.	3	0	0	0	3	0	3	2	2	0
36. U. Kansas	15	1	0	0	14	0	14	13	3	10
37. U. Kentucky	6	0	0	0	6	0	6	3	1	2
38. U. Louisiana	15	1	0	0	14	0	14	10	6	4

*Key: Same as for the 1954 Study.

THE SAMPLE FOR 1964 STUDY (Continued)

Name	1	2	3	4	5	6	7	8	9	10
39. John Hopkins	5	0	0	0	5	0	5	3	3	0
40. U. Maryland	27	0	0	0	27	0	27	22	6	16
41. Boston Coll.	4	1	0	0	3	0	3	2	0	2
42. Boston U.	---	---	---	---	---	---	---	---	---	---
43. Harvard	45	4	0	0	41	3	38	32	0	32
44. Mich. State	65	2	0	0	63	0	63	52	33	19
45. U. Michigan	48	6	0	0	42	4	38	35	34	1
46. Wayne State	38	1	0	0	37	0	37	34	2	32
47. U. Minn.	34	2	0	0	32	0	32	27	27	0
48. U. Miss.	9	0	0	0	9	0	9	6	0	6
49. St. Louis U.	2	0	0	0	2	0	2	1	1	0
50. U. Missouri	42	0	0	0	42	2	40	37	8	29
51. U. Mo. K.C.	2	0	0	0	2	1	1	1	1	0
52. Wash. U.	6	0	0	0	6	0	6	5	1	4
53. Mont. State Coll.	2	0	0	1	1	0	1	1	0	1
54. Mont. State U.	3	1	0	0	2	0	2	1	0	1
55. U. Nebraska	39	2	0	0	37	0	37	35	0	35
56. Rutgers U.	26	0	0	0	26	0	26	22	0	22
57. U. N. Mex.	3	0	0	0	3	0	3	2	1	1
58. Columbia	204	18	0	4	182	4	178	124	13	111
59. Cornell	20	7	0	1	12	0	12	9	6	3
60. Fordham	19	1	0	0	18	1	17	13	13	0
61. N. Y. U.	150	4	1	7	138	1	137	96	52	44
62. Rochester	3	0	0	0	3	0	3	2	0	2
63. St. Johns	10	0	0	0	10	0	10	6	6	0
64. Syracuse	16	2	0	0	14	0	14	9	0	9
65. Buffalo	15	0	0	0	15	0	15	14	0	14
66. Yeshiva	22	0	0	3	19	0	19	9	5	4
67. Duke	7	0	0	0	7	0	7	5	0	5
68. U. N. Carolina	15	0	0	0	15	0	15	13	11	2
69. U. N. Dakota	16	0	1	0	15	0	15	9	2	7
70. Ohio State	56	2	0	0	54	2	52	42	42	0
71. Ohio U.	10	1	0	0	9	1	8	8	8	0
72. Cincinnati	5	0	0	0	5	0	5	4	0	4
73. Toledo	4	0	0	0	4	1	3	2	0	2
74. Western Reserve	19	0	0	0	19	1	18	15	5	10
75. Okla. State	9	0	0	0	9	1	8	4	0	4
76. U. Okla.	28	0	0	0	28	1	27	21	2	19
77. U. Tulsa	9	0	0	0	9	0	9	8	0	8
78. Oregon State	9	0	0	0	9	2	7	6	2	4
79. U. Oregon	40	2	0	0	38	2	36	31	3	28
80. Portland	1	0	0	0	1	0	1	1	0	1
81. Dropsie	5	1	0	2	2	0	2	1	1	0
82. Penn. State	46	0	0	0	46	7	39	37	2	35
83. Temple U.	63	1	0	16	46	1	45	35	3	32
84. U. Penn	13	0	0	0	13	1	12	12	0	12
85. U. Pittsburgh	33	1	0	0	32	0	32	26	9	17
86. U. S. Carolina	3	1	0	0	2	0	2	2	2	0
87. U. S. Dakota	6	0	0	0	6	0	6	4	0	4
88. Geo. Peabody	43	1	0	2	40	0	40	34	8	26
89. U. Tennessee	20	0	0	0	20	0	20	14	0	14
90. Baylor	4	0	0	0	4	0	4	4	0	4
91. No. Tex. State	29	0	0	0	29	0	29	25	0	25
92. Tex. Tech.	8	0	0	0	8	0	8	5	0	5
93. U. Houston	18	2	0	0	16	1	15	12	0	12
94. U. Texas	42	1	0	0	41	0	41	29	23	6
95. Brig. Young	7	0	0	0	7	1	6	6	1	5

THE SAMPLE GROUP FOR 1964 STUDY (Continued)

Name	1	2	3	4	5	6	7	8	9	10
96. U. Utah	22	0	0	1	21	1	20	18	9	9
97. Utah State	1	0	0	0	1	0	1	1	0	1
98. U. Virginia	17	0	0	0	17	0	17	13	1	12
99. Wash. State U.	18	2	0	0	16	1	15	11	1	10
100. U. Washington	7	1	0	0	6	0	6	4	2	2
101. U. W. Va.	2	0	0	0	2	0	2	2	0	2
102. Wisconsin U.	44	2	0	0	42	2	40	31	31	0
103. U. Wyoming	22	1	0	0	21	0	21	18	4	14
Total	2432	131	2	39	2260	71	2189	1750	581	1169

TABLE A3

COMPARISON OF RESEARCH AND NO-RESEARCH GROUPS BY MEANS OF PROPORTIONALITY TESTS, CONTINGENCY TABLES, AND TESTS OF MEAN DIFFERENCES (p = .05)

Variable (Question #)	Ph.D.'s		Ed.D.'s		Total	
3-1	t=2.06*	Cv=1.98	t=.66	Cv=1.97	t=1.15	Cv=1.96
3-3	t=2.03*	Cv=1.98	t=2.14*	Cv=2.14	t=3.65*	Cv=1.96
6	X^2=4.233	df=5 Cv=11.07	X^2=8.665	df=5 Cv=11.07	X^2=12.823*	df=5 Cv=11.07
7-1	Z= -1.551		Z=.627		Z=1.533	
7-2	Z= -.854		Z=.298		Z=.193	
7-3	Z= -.455		Z=.239		Z=.065	
8	X^2=12.307*	df=3 Cv=7.82	X^2=6.012	df=3 Cv=7.82	X^2=28.876*	df=3 Cv=7.82
9-1	Z=1.140		Z=.935		Z=1.808	
9-2	Z=.697		Z=1.835		Z=2.477*	
10-1	Z= -1.687		Z=.678		Z=.244	
10-2	Z=1.759		Z=.976		Z=1.895	
11	Z=3.494*		Z=3.725*		Z=5.686*	
12	t=.58	Cv=1.98	t=1.23	Cv=1.97	t=2.28*	Cv=1.96
13a	X^2=9.280	df=6 Cv=12.59	X^2=10.132	df=6 Cv=12.59	X^2=16.550*	df=6 Cv=12.59
13b	X^2=3.171	df=6 Cv=12.59	X^2=18.083*	df=6 Cv=12.59	X^2=18.921*	df=6 Cv=12.59
14	X^2=5.960	df=6 Cv=12.59	X^2=19.515*	df=6 Cv=12.59	X^2=22.125*	df=6 Cv=12.59
16-1	Z= -.929		Z= -.154		Z=.824	
18a	z=.242		Z= -.119		Z=.230	
18b	Z=.727		Z=.333		Z=.426	
19a	X^2=4.541	df=7 Cv=14.07	X^2=6.086	df=7 Cv=14.07	X^2=4.398	df=7 Cv=14.07
19b	X^2=7.765	df=8 Cv=15.51	X^2=11.997	df=7 Cv=14.07	X^2=6.028	df=7 Cv=14.07
20	Z=5.902*		Z=6.986*		Z=6.679*	
21-5	Z=2.488*		Z=1.540		Z=2.345*	
22a	X^2=4.055	df=4 Cv=9.49	X^2=9.394	df=4 Cv=9.49	X^2=10.347*	df=4 Cv=9.49
23-1	X^2=3.057	df=3 Cv=7.82	X^2=6.228	df=3 Cv=7.82	X^2=12.573*	df=3 Cv=7.82
26	X^2=8.448	df=5 Cv=11.07	X^2=4.720	df=5 Cv=11.07	X^2=16.487*	df=5 Cv=11.07
27	X^2=4.586	df=5 Cv=11.07	X^2=8.944	df=5 Cv=11.07	X^2=7.347	df=5 Cv=11.07
28	X^2=8.018	df=5 Cv=11.07	X^2=5.444	df=5 Cv=11.07	X^2=7.608	df=5 Cv=11.07
29	Z=6.517*		Z=5.909*		Z=9.439*	
31	Z=.965		Z=1.099		Z=2.018*	
35	Z=3.640*		Z=3.190*		Z=5.489*	
38	Z= -.591		Z= -.830		Z=.847	
39	X^2=2.274	df=4 Cv=9.49	X^2=3.826	df=4 Cv=9.49	X^2=3.088	df=4 Cv=9.49
41-1	Z= -2.079*		Z= -1.313		Z=2.318*	
41-2	X^2=5.608	df=4 Cv=9.49	X^2=1.759	df=4 Cv=9.49	X^2=2.625	df=4 Cv=9.49

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*Significant difference

The critical value for all Z values is ± 1.96

TABLE A3 (Continued)

Variable (Question #)	Ph.D.'s		Ed.D.'s		Total	
42	Z=.789		Z=1.917		Z=2.265*	
42-1	t=3.07*	Cv=2.00	t=2.30*	Cv=1.99	t=1.66	Cv=1.96
46	Z=4.881*		Z=6.747*		Z=8.611*	
47-1	Z=.975		Z=1.537		Z=2.702*	
48	X^2=1.564	df=5 Cv=11.07	X^2=9.371	df=4 Cv=9.49	X^2=4.130	df=5 Cv=11.07
58	Z=6.198*		Z=9.081*		Z=11.000*	
61-1	X^2=15.927*	df=6 Cv=12.59	X^2=53.873*	df=9 Cv=16.92	X^2=65.644*	df=9 Cv=16.92
61-2	Z=.000		Z=1.075		Z=.722	
62-1	Z=.000		Z= -1.379		Z=1.357	
62-2	Z= -.741		Z= -1.143		Z=1.558	
62-3	Z=1.775		Z=2.362*		Z=2.985*	
63-1	X^2=3.105	df=5 Cv=11.07	X^2=4.858	df=6 Cv=12.59	X^2=3.420	df=6 Cv=12.59
63-3	X^2=29.44*	df=10 Cv=18.31	X^2=58.18*	df=10 Cv=18.31	X^2=77.09*	df=10 Cv=18.31

TABLE A-4

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BMDC4M - DISCRIMINANT ANALYSIS-TWO GROUPS - VERSION OF MAY  26, 1964
HEALTH SCIENCES COMPUTING FACILITY, UCLA

 PROBLEM NO.    1 -          (Ph.D. only; 46 research vs. 56 no-research cases)
 NUMBER OF VARIABLES  18

 VARIABLE MEANS BY GROUP AND DIFFERENCE IN MEANS
 VARIABLE         MEAN 1            MEAN 2            DIFFERENCE
    1            35.39130          38.94643           -3.55512
    2             2.84783           3.33929           -0.49146
    3             2.45652           3.08929           -0.63276
    4             1.56522           1.80357           -0.23835
    5             4.32609           4.78571           -0.45963
    6             3.97826           4.75000           -0.77174
    7             3.78261           3.00000            0.78261
    8             1.30435           1.87500           -0.57065
    9             1.23913           1.51786           -0.27873
   10             1.15217           1.76786           -0.61568
   11             1.56522           1.91071           -0.34550
   12             1.93478           1.80357            0.13121
   13            25.93478           4.03571           21.89907
   14             1.41304           1.83929           -0.42624
   15             1.63043           1.67857           -0.04814
   16             1.41304           1.91071           -0.49767
   17             1.93478           1.28571            0.64907
   18             4.02174           1.73214            2.28960

DISCRIMINANT FUNCTION COEFFICIENTS
    -0.00092         -0.00387         -0.00118         -0.00150         -0.00255          0.00212          -0.00117
    -0.03591         -0.02637         -0.03974         -0.00084          0.04118          0.00035          -0.00755
     0.01306         -0.03786          0.00223          0.00038

MAHALANOBIS DSQUARE=          9.42196

F(18, 83)=         10.97217

POP. NO.     SAMPLE SIZE        MEAN Z               VARIANCE Z           STD. DEV. Z
    1             46           -0.13096              0.00105              0.03241
    2             56           -0.22518              0.00085              0.02922
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STUDY OF RESEARCH TRAINING

Center for the Study of Higher Education
University of California, Berkeley

1. Name ______________________ Institution ______________________
   Position and title ______________________________

2. Please indicate the field(s) in which you received your education and your speciality within the field(s).
   Undergraduate field ____________ Speciality ______________________
   Master's field ____________ Speciality ______________________
   Doctoral field ____________ Speciality ______________________
   Post-Doctoral study ____________ Speciality ______________________

3. Give the full name of the professor who served as chairman of your dissertation research.
   ____

4.a. Please indicate your age at each of the following stages in your educational or research career.

Stage	Age
Bachelor's degree	________
Master's degree	________
Doctoral degree	________
Post-Doctoral study (if any)	________
First research project (age at beginning)	________
First post-doctoral research appointment	________
First post-doctoral research project	________
First research publication	________

b. Was your education interrupted by war service? Yes ________ No ________
   If yes, at what stage? ______________________________
   For how long? ______________________________

5. How would you rate the influence of the following in the development of your interest in research?

	High	Moderate	Low
Pre-college experiences of a research nature	___	___	___
Undergraduate courses	___	___	___
Graduate courses	___	___	___
Research readings	___	___	___
Seminar reports	___	___	___
Opportunity to be active in research as a graduate student	___	___	___
Encouragement of graduate major professor	___	___	___
Encouragement of undergraduate professor(s)	___	___	___
Encouragement of parents	___	___	___
Encouragement of spouse	___	___	___
Encouragement of employer(s)	___	___	___
Availability of financial aid (scholarship, grant, etc.)	___	___	___
Other influences (please specify):			
______________________	___	___	___
______________________	___	___	___
______________________	___	___	___

6. Did you have any research experience (for example, in a governmental or educational agency) in the years intervening between your undergraduate and graduate

programs? Yes____________ No____________
If yes, please indicate:
In what institution, research center or unit____________________________
For how long____
The nature of the experience____________________________________
____

7. Please rank which 3 or 4 of the following resources contributed most to the support of your doctoral study?
Income from:
- Full-time employment ____________
- Part-time work ____________
- Research assistantship ____________
- Teaching assistantship ____________
- G. I. Bill ____________
- Government fellowship or scholarship ____________
- Other fellowship or scholarship ____________
- Savings ____________
- Income from Investments ____________
- Loan ____________
- Parents' aid ____________
- Spouse's job ____________
- Spouse's parents' aid ____________
- Other (please describe):

____
____

8. How important were the following factors in your selection of the institution in which you received your doctoral degree?

	Of Highest Importance	Of Moderate Importance	Of No Importance
General standing of the university			
Convenience of location			
Living conditions favorable			
Reputation of a particular faculty member			
Scholarship available			
Research opportunities available			
Strongly recommended by adviser or friend			
Work available for spouse			

Other reasons (please specify):
____
____

9. How many courses in college math did you have?
(1)__________None (2)__________One (3)__________Two (4)__________Three
(5)__________Four or more

10. Which of the following types of courses or topics in statistics did you have in your graduate program? (Please indicate the department in which the work was taken.)

	Work Taken	Teaching Department
Elementary statistics		
Analysis of variance and co-variance		
Multiple correlation and regression		
Factor analysis		
Non-parametric techniques		

Survey sampling		
Biostatistics	____	________________
Other (please specify):	____	________________
	____	________________

____

____

11. Please list the approximate titles of all other research courses you had in your graduate training. In what departments were they taught?

Courses	Departments
1________________	________________
2________________	________________
3________________	________________
4________________	________________
5________________	________________
6________________	________________
7________________	________________

12. Which of the courses in questions 9 and 10 above were most helpful to you in your research career?

1________________	5________________
2________________	6________________
3________________	7________________
4________________	8________________

13. If you took any courses in educational research and statistics during your doctoral program, how did the standards in these courses compare with research courses you had in other fields?

(1)________Better (2)________Equal (3)________Poorer
(4)________Does not apply

14. Please check which foreign languages were required in your doctoral program and indicate to what extent they were useful in your research.

	Language Required	Particularly Useful	Moderately Useful	Not Particularly Useful
German	____	____	____	____
Spanish	____	____	____	____
French	____	____	____	____
Russian	____	____	____	____
Other (please specify)				
________________	____	____	____	____
________________	____	____	____	____

15. In which do you currently read? ________________________

____

16. How many years elapsed between your first enrollment as a graduate student and the award of your doctoral degree?

(1)________2 years (3)________4 years (5)________6 to 10 years
(2)________3 years (4)________5 years (6)________11 or more years

17. In terms of years and/or semesters, in the period between admission to the doctoral program and graduation, for what portion of this time were you:

	Years	Semesters
In continuous residence	____	____
In full-time residence	____	____
In summer session residence	____	____
In part-time residence	____	____
Registered in absentia	____	____
On leave of absence	____	____

18. From the list below, please check the examinations you were given and the

activities you were required to perform during your doctoral program.

Standardized Admissions examinations ____________
Foreign language examinations ____________
Written comprehensive examinations ____________
Oral examination on dissertation ____________
Design a research proposal ____________
Design and execute a pre-dissertation research study
Write critiques of research ____________
Present a research seminar(s) ____________

19. While you were a doctoral student did you:

	Yes	No
Have any course(s) or formal preparation in research writing		
Publish any research paper(s) on your own		
Serve as a joint author of a research paper(s)		
Read a research paper at a professional meeting		
Address a seminar on your dissertation research		
Participate as a member of a research panel, colloquia, symposium		
Serve on a professional research team		

20. Check whether you had instruction, experience (or both) in the following research activities during your graduate studies.

	Instruction	Experience
Programming		
Coding and data processing		
Writing an application for research support		
Designing and implementing a pilot study		

21. Approximately what proportion of the faculty members in your field were actively engaged in research at your graduate institution?

____________%

22. In your graduate institution, to what degree:

	To a High Degree	To a Moderate Degree	To a Low Degree
Was research emphasized in your graduate courses			
Were you free to select your own dissertation topic			
Were you encouraged to engage in interdepartmental studies or research			
Did seminars stimulate your research interests			
Were research colloquia, symposia, etc. available			
Were opportunities for informal research discussions available			
Were you encouraged to experiment with new research design and methods			
Was guidance and direction in your research adequate			
Were opportunities for active involvement in research available to graduate students			

23. How adequate were each of the following research aids or facilities at your graduate institution:

	Good	Fair	Poor	Not Available
Library				
Laboratory facilities				

	Good	Fair	Poor	Not Available
Data processing aids				
Computer services				
Consultants on research design				
Editorial assistance				
Space for research-study				
Advising on research				
Clerical assistance				
Subjects for research				
Research data already available (for use in doctoral dissertation)				
Funds for graduate student research				

24. Please check any of the following research appointment(s) which you held during your graduate program and indicate the length of the appointment(s).

I held a research appointment in:		Length of appointment (in years or fraction of years)
My major department		
An outside department		
A research center		
A research institute		
A field service center		
A data processing center		
A programming/computer center		
A laboratory (please describe)		
Other (please describe)		

25. If you held a research appointment as a student, at what level and in what year in your educational program did it occur?

		Year(s)				
		1st	2nd	3rd	4th	Other (specify)
Pre-college level						
Undergraduate level						
Master's level						
Doctoral level						
Post-doctoral level						

26. If you held a research appointment as a graduate student, please indicate whether or not the research was:

	Yes	No
Related to your thesis or dissertation		
The source of your dissertation data		
Directed by your sponsor (or major professor)		
Directed by a faculty member in Education		
Directed by a faculty member in another discipline		

(If so, please specify which discipline:
____)

27. If you worked on a research team during your graduate program, did the team include:

	Yes	No
Your major professor		
Other faculty members in your department		
Inter-disciplinary researchers		
Other graduate students		
Post-doctoral fellows		

	Yes	No
Off-campus researchers	________	________
Did not work on a research team during graduate study	________	

28. How would you describe the faculty-student relationships at your graduate institution during the period in which you were working for your doctoral degree?
(1)________Excellent (2)________Fairly satisfactory
(3)________Satisfactory (4)________Unsatisfactory

29. In what ways were student-faculty relationships encouraged in your graduate institution?
Formally (please describe):____
____
____
Informally (please describe):______________________________________
____
____

30. Please indicate any gaps or weaknesses you found in your graduate training for research.

Gaps	Weaknesses
________________	________________
________________	________________
________________	________________
________________	________________
________________	________________
________________	________________
________________	________________

31. Please indicate those aspects of your graduate training which were most helpful in your subsequent research activities.
____
____
____
____
____
____
____
____
____
____
____

Thank you for your cooperation. In the interviews we plan to include questions which will provide us with additional data on your professional experiences and on your ideas regarding research training.

Interview Schedule

Study of Research Training

Center for the Study of Higher Education

1. Will you please trace the important highlights in the development of your interest in research. Please indicate any pre-university factors.

2. Did your active participation in research antedate your graduate school training? If so, please indicate:
   How participation was initiated ______________________________
   ____
   By whom ______________________________
   Where ______________________________
   At what stage in your formal education ______________________________
   ____
   What was the nature of the research ______________________________
   ____
   ____

3. a. When in your graduate program did you actively become involved in research?
   ____
   ____
   b. How was your participation initiated? ______________________________
   ____
   c. By whom were you directed? ______________________________

4. At what stage in your career did you work on an independent research project?

5. What formal experiences in your graduate program were most conducive to your development as a researcher?

6. What informal experiences in your graduate program were most helpful to your development as a researcher?

7. What institutional factors in your graduate university favored your development as a researcher?

8. How would you describe the optimal research environment for a graduate student?

9. For a faculty researcher?

10. Did your graduate department have regular informal gatherings between faculty and graduate students? If so, please describe the purpose and character of these meetings.

11. To what degree were these meetings helpful in your research development?

12. How would you describe the student-faculty relationship in your graduate institution?

13. What effect, if any, did this relationship have on your interest in research?

14. How, and to what extent, did your graduate program reflect the relationship between your field and related fields?

15. To what extent were faculty members outside of your field involved in your training?

16. Please describe the nature and character of the integration between the disciplines as represented in your program of study.

17. What methods do you recommend for identifying high research potential among graduate students?

18. If early immersion in research activity seems desirable, what programs and facilities should be available to provide the needed experiences?

19. Do you have any particular method for encouraging your students to publish their research?

20. Has your university initiated any new programs to strengthen research preparation within the past five years? If so, please describe the innovation.

21. In what way, if any, are the various research institutes on campus used for training graduate students?

22. Does the institution (the department) have any reciprocal or cooperative arrangement with off-campus organizations which provide supplementary research training for graduate students? If so, please describe the nature of this arrangement.

23. Are there institutional policies in this institution (or in your graduate institution) which act as incentives toward research? If so, are these policies sound, in your judgment?

24. If you could design an ideal research training program for doctoral students in education, what would you include?

25. Please submit a list of your publications.

1954 AND 1964 QUESTIONNAIRES

A Study of
TRAINING FOR EDUCATIONAL RESEARCH

A Questionnaire to Persons Who Received a
Doctoral Degree in Education
in the year
1954

The Center for the Study of Higher Education
University of California, Berkeley
with the support of the
Division of Educational Research
U. S. Office of Education

1954 QUESTIONNAIRE

_______ (Serial Number) _______

1. Name_______________ (last name) _______ (first) _______ (middle) (1)___Ph.D.; (2)___Ed.D.
Sex: (1)___M (2)___F

2. Present position: Title _______________________

Institution or business _______________________

Address _______________________

3. (1) Age at bachelor's degree___; (2) master's___; (3) doctor's___

4. Sub-field of Education in which doctor's degree received: (check one)

(1)___Educ. Admin.
(2)___Educ. Psych.
(3)___Curriculum
(4)___Counseling
(5)___Educ. Methods
(6)___Hist. of Educ.
(7)___Phil. of Educ.
(8)___Educ. Socio.
(9)___Other_______________

5. If you specialized on a particular educational level, indicate:

(1)___Pre-school
(2)___Elementary
(3)___Secondary
(4)___Higher Education
(5)___Adult
(6)___None

6. Approximate number of courses in Education as an undergraduate:

(1)___None; (2)___1-3; (3)___4-6; (4)___7-9; (5)___10 or more

7. a. Married when you received bachelor's degree? (1)___Yes; (2)___No
b. Married when you received master's degree? (1)___Yes; (2)___No
c. Married when you received doctor's degree? (1)___Yes; (2)___No

8. Indicate your teaching and/or other school experience before doctor's degree:

(1)___None; (2)___1-5 years; (3)___6-10 years; (4)___11 years or more

9. What research experience did you have prior to receiving doctor's degree?

(1)___research assistant to a professor
(2)___research assistant in a research bureau or center
(3)___other (specify)_______________________
(4)___no research experience

10. Did you write a master's thesis? (1)___Yes; (2)___No

If your answer is yes, did you collect and analyze a body of original data?
(1)___Yes; (2)___No

11. Did you publish (individually or joint authorship) any research reports prior to receiving the doctor's degree? (1)___Yes; (2)___No

12. During your graduate work, how many semesters (or quarters) were you a full-time student? (1)____number of semesters; or (2)____number of quarters

13. How many years elapsed between your first enrollment as a graduate student and the award of your doctor's degree?
(1)___2 years (3)___4 years (5)___6 to 10 years
(2)___3 years (4)___5 years (6)___11 years or more

(a) During how many of these years did you have a full-time job?
(1)___none (3)___2 years (5)___4 years
(2)___1 year (4)___3 years (6)___5 years or more

14. What was the longest period of continuous full-time residence as a graduate student in the institution from which you received the doctor's degree? (This means while not having a full-time job.)

(1)___6 mos.; (2)___9 mos.; (3)___12 mos.; (4)___15 mos.; (5)___18 mos. or more

15. Between first enrolling for graduate work and the award of the doctor's degree,

	None	1 to 3	4 or more
(a) How many summers were you a student. . . .	___	___	___
(b) How many summers did you work on a job . .	___	___	___
(c) How many summers used for vacation only. .	___	___	___

16. Was part of your graduate work done outside the United States?

(1)___Yes; (2)___No

(a) If your answer is yes, in what country? ______________________________

(b) What part of the expense for foreign study was paid by a stipend or grant?

(1)___none; (2)___part of it; (3)___all of it

17. During how many semesters (or quarters) did you have a

	Semesters	(or)	Quarters
(a) research scholarship or assistantship?	______		______
(b) teaching assistantship?	______		______
(c) fellowship or scholarship requiring no service	______		______

18. Were your parents ever employed in teaching or educational work?

(a) Father: (1)___Yes; (2)___No (b) Mother: (1)___Yes; (2)___No

19. Please indicate by check marks the highest educational attainment of each parent.

	Father	Mother
1 Elementary school.	(1)___	(1)___
2 Some high school	(2)___	(2)___
3 High school graduate	(3)___	(3)___
4 Some college	(4)___	(4)___
5 College graduate	(5)___	(5)___
6 Some graduate study.	(6)___	(6)___
7 Master's degree.	(7)___	(7)___
8 Doctor's degree.	(8)___	(8)___

20. Have you ever published a research study that was closely related to the subject of your doctor's dissertation? (1)___Yes; (2)___No

21. From what institution did you receive your

(a) Bachelor's degree ____________________ Major subject __________

(b) Master's degree ____________________ Department __________

(c) Doctor's degree ____

22. When did you first decide to study for a doctor's degree?

(1)___while in high school
(2)___between high school and college
(3)___while in college
(4)___after college graduation

(a) If after college graduation, how long after?
(1)___1-3 years; (2)___4-6 years; (3)___7 years or more

23. When you first entered graduate school, (check to indicate)

(1)___My original objective was no more than a master's degree.
(2)___My objective from the beginning was a doctor's degree in Education.
(3)___My original objective was a doctor's degree in another department and I later changed to Education.

(a) If you checked number 3, how long before changing to Education?
(1)___less than 1 yr.; (2)___1 yr.; (3)___2 yrs.; (4)___3 yrs. or more

24. If you were beginning your graduate work now, which subject would you choose as a major field ______________________________

If you would choose Education, which sub-field would you prefer?

(1)___Educ. Admin.
(2)___Educ. Psych.
(3)___Curriculum
(4)___Counseling
(5)___Educ. Methods
(6)___Hist. of Educ.
(7)___Phil. of Educ.
(8)___Educ. Socio.
(9)___Other______________

25. Among your professors in graduate school, give below the full name of the one who was most influential in stimulating an interest in research.

(1)____ (2) None was___

26. How many courses in statistical methods did you take as a student?

(1)___none; (2)___one; (3)___two; (4)___three; (5)___four or more

27. How many courses in research methodology have you had? (Not including dissertation seminars or statistics courses)

(1)___none; (2)___one; (3)___two; (4)___three; (5)___four or more

28. How many courses in college mathematics have you had?

(1)___none; (2)___one; (3)___two; (4)___three; (5)___four or more

29. Are you now actively working on a research project? (1)__Yes; (2)__No

30. Please check below in Column A the topics which were taught in courses you had as a student; in Column B, topics not studied as a student but which you have learned since; and in Column C, topics which you have used in your own research

Topics	(A) Taught in courses Yes No	(B) Learned since Yes No	(C) Used in research Yes No
1 Elementary descriptive statistics .	___(1)___	___(1)___	___(1)___
2 Correlation	___(2)___	___(2)___	___(2)___
3 Sampling theory; *f* and *t* tests. . .	___(3)___	___(3)___	___(3)___
4 Factor analysis	___(4)___	___(4)___	___(4)___
5 Anal. of variance and co-variance .	___(5)___	___(5)___	___(5)___
6 Multivariate analysis	___(6)___	___(6)___	___(6)___
7 Nonparametric techniques.	___(7)___	___(7)___	___(7)___
8 Experimental design	___(8)___	___(8)___	___(8)___
9 Computer programming techniques . .	___(9)___	___(9)___	___(9)___

31. Were you a teaching assistant while a graduate student? (1)__Yes; (2)__No

(a) If your answer was yes, evaluate the experience from it by checking below

	High	Average	Low
1 Value for college teaching	(1)__	(2)__	(3)__
2 Value as training for doing research .	(1)__	(2)__	(3)__

32. The items listed below express some of the reasons why students select a graduate school. For each stated reason, please check the numbers that, as nearly as you can remember, accounted for your choice of the graduate school from which you received the doctor's degree.

	Of highest importance	Moderately important	Of no importance
1 General standing of the university. .	(1)__	(2)__	(3)__
2 Convenient location	(1)__	(2)__	(3)__
3 Reputation of a particular faculty member.	(1)__	(2)__	(3)__
4 Living conditions favorable and economical.	(1)__	(2)__	(3)__
5 Scholarship available	(1)__	(2)__	(3)__
6 Research opportunities attractive . .	(1)__	(2)__	(3)__
7 Work available for spouse	(1)__	(2)__	(3)__
8 Strongly recommended by a friend or advisor	(1)__	(2)__	(3)__

9 Other important reasons that influenced your choice ______________________________

33. In doing research now, would you usually prefer to work: (check only one)

(1)__With one or more assistants
(2)__As a member of a team
(3)__As leader of a team
(4)__ Individually
(5)__ Jointly with an associate
(6)__ No preference

34. In your graduate work, rank the following in respect to their value as preparation for doing research: (check numbers)

	Great value	Some value	Little value	No basis for answer
1 Research technique courses.	(1)___	(2)___	(3)___	(4)___
2 Writing reports based on research literature.	(1)___	(2)___	(3)___	(4)___
3 Doing minor research projects . . .	(1)___	(2)___	(3)___	(4)___
4 Assisting professors with their own research.	(1)___	(2)___	(3)___	(4)___
5 Work on your dissertation	(1)___	(2)___	(3)___	(4)___
6 Work in a research bureau	(1)___	(2)___	(3)___	(4)___

35. Did you work in a research bureau (center, institute) during your period of graduate study? (1)___Yes; (2)___No

If your answer was yes, evaluate your experience by checking as many items as apply below.

(1)___My work was routine, with no value to me other than financial.
(2)___My work enabled me to put into practice what I learned in courses.
(3)___My own work had little educational value, but I learned a great deal about research from others in the bureau.
(4)___The experience of working in the bureau was the most valuable part of my research training.
(5)___I had little opportunity to learn about the problems that were being researched or to become acquainted with the designs of the studies.

36. If you were asked to prepare a chapter for a forthcoming yearbook, check the one you would most enjoy doing. (check one only.)

(1)___Make an annotated bibliography on the subject of the yearbook
(2)___Write a summary and interpretation of the available research on the subject
(3)___Collect and interpret a body of new data on the problem
(4)___Write a theoretical chapter dealing with the problem

37. If, during his graduate work, a student could have a one-year research fellowship, in which year do you think it would be most helpful?

(1)___First year; (2)___Second year; (3)___Last year

38. As a graduate student, did you belong to a departmental club of any sort?

(1)___Yes; (2)___No

If yes, how would you rate its educational value to you?

(1)___Highly valuable; (2)___Some value; (3)___Little value; (4)___No value

39. While a graduate student, were you invited to the home of your dissertation adviser?

(1)___Frequently; (2)___Occasionally; (3)___Once; (4)___Never

40. Please check the items below to indicate how you financed your doctoral work. Double check (xx) the two principal sources of support.

(1)____Teaching or research assistantship
(2)____G. I. Bill
(3)____Government fellowship or scholarship
(4)____Other fellowship or scholarship
(5)____Spouse's job
(6)____Parents' aid or spouse's parents' aid
(7)____Withdrew savings
(8)____Borrowed money
(9)____Part-time work
(10)____Income from investments
(11)____Other (please describe) ________________________________

41. At the time of receiving your doctor's degree, were you in debt for your education? (1)___Yes; (2)___No

If your answer was yes, approximately what per cent was your debt of your total income for the following 12 months?

(1)___10%; (2)___25%; (3)___50%; (4)___75%; (5)___100%

42. Are you now in an academic position? (1)___Yes; (2)___No

If your answer was yes, approximately what per cent of your time is spent in:

(1)___% Teaching; (2)___% Research; (3)___% Other duties

43. Of your graduate school professors now living, list the name of the one that you consider most outstanding in research production up to the present time.

(Name) ____

44. Of the professional associations of which you are a member, please list the two which are of greatest value to you.

1________________________ 2 ________________________

45. Please list below the two professional journals that you find of greatest value in your work.

1____________________________________

2____________________________________

46. During the first year following your doctor's degree, did you engage in any research projects? (1)___Yes; (2)___No

47. Were you ever a research assistant or did you ever participate in research projects in a department other than Education? (1)__Yes; (2)__No

If your answer was yes, in what department(s)?

____

48. As a graduate student, approximately how many courses did you take that were outside the department of Education?

(1)__None; (2)__1-3; (3)__4-6; (4)__7-9; (5)__10 or more

/If your answer to question 48 was "none," skip to question number 57 and proceed. If you had courses in other departments, continue with the questions below./

49. In the research which you have done, were the methods used learned:

(1)__Mainly in courses in Education, or
(2)__in courses outside the department of Education.

50. When you attended graduate courses outside the department of Education:

(1)__Did you feel "at home" among the students, or
(2)__Did you feel like an outsider?

51. In graduate courses outside the department of Education, did you feel that the professors were less interested in your work than if you had been a regular student in their departments? (1)__Yes; (2)__No

52. In general, did you find it easy or difficult to make acquaintances among students outside the department of Education? (1)__Easy; (2)__Difficult

53. In general, were your acquaintances with students outside your department based on personal or on academic interests? (1)__Personal; (2)__Academic

54. Indicate below the particular kinds of values contributed to you by courses outside the department of Education. (Check as many as apply)

(1)__Opened up problems which I considered as possible subjects for research
(2)__Taught new techniques of research not encountered in my courses in Education
(3)__Emphasized a higher level of scholarly research than in my courses in Education
(4)__Scholarly competence of instructors motivated higher standards in my work as compared with courses in Education
(5)__Courses were not of any particular value as training for research
(6)__My selection of a dissertation topic was directly influenced by courses outside the department of Education
(7)__Other values, or comments about courses taken outside the department of Education:

____

55. List any courses taken outside the department of Education that were of special value as preparation for doing research.

	Approximate Title	Department
1	______________________________	____________________
2	______________________________	____________________
3	______________________________	____________________
4	______________________________	____________________

56. As a graduate student, check as many as apply to indicate why you enrolled for courses outside of the Department of Education.

(1)___ They were required in my graduate program
(2)___ My adviser in Education suggested that I take them
(3)___ I took them as electives because I was interested in their content
(4)___ I was induced by other graduate students to take them
(5)___ I found their content more "meaty" than that of Education courses

(6)___ Other reasons ____

____

57. Our main concern in this study is to find ways of improving the preparation for educational research. Since as a graduate student you have experienced what one university did in training educational researchers, we shall appreciate your frank and serious suggestions regarding ways to improve graduate programs for research. We are interested both in suggestions for new procedures and criticisms of old procedures. Use the space below.

58. Did your work during the first year of your post-doctoral employment result in a published research article, either then or since? (1)___Yes; (2)___No

59. In your judgment, have your academic promotions during the last ten years been due mainly to: (check one)

(1)___Research production
(2)___Public and field service
(3)___Excellence in teaching
(4)___Administrative services
(5)___Other (please comment)_________

____

60. If you are now in academic work, how does your present position compare with the position that, at the time of receiving the doctor's degree, you hoped you would have at the end of ten years? (check one in each line)

In respect to	Far better	Some better	About what I expected	Less than expected	A marked disappointment
1 Teaching	(1)___	(2)___	(3)___	(4)___	(5)___
2 Research opportunity	(1)___	(2)___	(3)___	(4)___	(5)___
3 Financial returns	(1)___	(2)___	(3)___	(4)___	(5)___
4 Professional status	(1)___	(2)___	(3)___	(4)___	(5)___
5 A "good life"	(1)___	(2)___	(3)___	(4)___	(5)___
6 Not in academic work	_____				

61. For how many active doctoral candidates are you the major adviser this year?

(1)___None
(2)___1 to 3
(3)___4 to 6
(4)___7 to 9
(5)___10 to 12
(6)___13 to 15
(7)___16 to 18
(8)___19 to 21
(9)___22 to 24
(x)___If more than 24, how many?___

(a) Do you consider your adviser load too heavy? (1)___Yes; (2)___No

62. Since receiving your doctor's degree, have you engaged in any refresher or up-grading activities related to your professional work, such as:

	Yes	No
(1) Regular courses, as in summer school.	___	___
(2) Workshops or special seminars	___	___
(3) Systematic study or research during a sabbatical leave. .	___	___

(4) Other activities (explain)______________________________

____

____

63. Please list the positions you have held during the ten years, 1954-1964. (Omit Summer teaching positions. Use ditto marks as needed)

Academic year	Position (title and rank)	Place (Institution)
1954-55		
1955-56		
1956-57		
1957-58		
1958-59		
1959-60		
1960-61		
1961-62		
1962-63		
1963-64		

64. Please list all research articles or monographs you have published during the ten years, 1954-1964 (abbreviate, i. e., J. Ed. Res.)

Year	Publication Reference	Title
1955		
1956		
1957		
1958		
1959		
1960		
1961		
1962		
1963		
1964		

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58. Please list below all stipends (from scholarships, fellowships, research assistantships, teaching assistantships, etc.) which you received during your graduate study. Do not include part-time jobs such as routine work not related to your academic objectives.

	Type of Stipend	Amount
1	______________________________	__________
2	______________________________	__________
3	______________________________	__________
4	______________________________	__________

59. From what sources were the stipends received?

1___ U. S. Government (kind) ______________________________
2___ Foundations (which) ______________________________
3___ University funds ______________________________
4___ Other (explain) ______________________________

60. What was the approximate total cost of tuition and fees for your graduate work? (Do not include those paid by non-service scholarships)

Approximately
(1)___ $1 to $499
(2)___ $500 to $999
(3)___ $1,000 to $1,499
(4)___ $1,500 to $1,999
(5)___ $2,000 to $2,999
(6)___ $3,000 to $3,999
(7)___ $4,000 to $4,999
(8)___ $5,000 or more

61. What amount of any stipends that you received was for the direct cost of the research for your dissertation?

(1)___ No stipends
(2)___ None for dissertation
(3)___ $1 to $499
(4)___ $500 to $999
(5)___ $1,000 to $1,999
(6)___ $2,000 to $2,999
(7)___ $3,000 to $3,999
(8)___ $4,000 or more

62. Did you refuse any stipends that were offered to you? (1)___Yes; (2)___No

If yes, please explain why______________________________

____

63. How many applications for stipends did you make that were turned down?

(1)___None; (2)___1 to 4; (3)___5 to 8; (4)___9 or more

(a) If any were turned down, what reasons were given?____________________

____

64. Check below to indicate number of dependents at the time you received your doctoral degree.

Total number of dependents:
(1)___none
(2)___one
(3)___two
(4)___three
(5)___four
(6)___five
(7)___six
(8)___seven or more

65. If you were in debt at the time of receiving your doctoral degree, how many years do you estimate it will take to pay off the debt? (Do not include debt for capital investment, such as buying a house.)

(1)___no debt
(2)___one year
(3)___two years
(4)___three years
(5)___four years
(6)___five years or more

66. For the most recent year in which you were a full-time student, approximately how much were your total expenses for 12 months, including both educational expenses and living expenses for yourself and your dependents?

(1)___under $2,000
(2)___$2,000 to $2,999
(3)___$3,000 to $3,999
(4)___$4,000 to $4,999
(5)___$5,000 to $5,999
(6)___$6,000 to $6,999
(7)___$7,000 to $7,999
(8)___$8,000 or more

67. We would like a descriptive abstract of your dissertation. Please be as explicit as you can in following the suggested headings below.

(a) Title of your dissertation

(b) Brief description of procedure followed:

(c) Kinds of evidence (data) collected, and size of the sample obtained

67. (Continued)
    (d) What methods were used in obtaining data?

    (e) Design of the study, if experimental:

    (f) Statistical techniques employed in analyzing data or testing hypotheses:

    (g) Did you use a computer in processing your data?

    (h) Other comments:

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